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FALL 1996
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OCTOBER 1996

GUIDE TO

HOME THEATER

EVERYTHING YOU NEED TO KNOW ABOUT HOME THEATER



Dipping into AC-3

Digital Chips

Cosmic
Controversy:

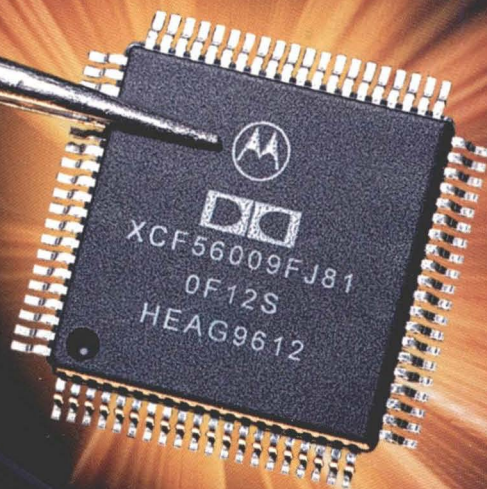
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THE EDITOR'S VIEW

BRINGING UP BABY

Lawrence E. Ullman

Since the birth of my daughter two and a half years ago, I've learned that being a parent means constantly being surprised. With each passing day, she is developing into a *very* independent little person. She always knows exactly where she wants to go; it is our job as parents to keep up, guiding and nurturing her along the way.

Like my daughter, this issue of *SGHT* seemed to know where it wanted to go right from the start. It took its first steps when—after talking with several manufacturers about why their new Dolby Digital (AC-3) products are so late—I commissioned Robert Harley to write “The Chips are Down,” a feature detailing the birthing pains behind Motorola's long-awaited 56009 AC-3 decoder chip.

After discussing the chip feature, our conversation turned to another digital-audio topic. After mentioning how much better his laserdisc player sounds on both music and movies when used with an outboard digital-to-analog converter (DAC), Robert suggested reviewing a group of relatively low-cost units. “Great idea,” I agreed, “but what about readers who may not be familiar with the basic concepts and terminology?” Thus was conceived the introductory feature, “Outboard DACs: A Sound Upgrade,” which not only complements Harley's triple-DAC review, but Thomas J. Norton's review of the Theta Data III LD/CD transport as well. (You'll find both reviews in this issue's “Equipment Reports” section.)

A few days later, author Michael Fremer paid a visit to Santa Fe. One of the items on his itinerary was a visit to Tom Norton's house, where a prototype DTS decoder was in residence. After a showing of *Casper* encoded in this controversial format, Michael, Tom, and I schmoozed long into the night about the advantages and disadvantages of discrete-digital surround sound.

When Michael called a few days later to suggest an article describing his reaction to the DTS demo as well as some recent discrete-surround experiences at commercial cinemas, I readily agreed. Once his draft arrived, I asked Tom to take a look. (The demo was held in his house, after all!) Tom's written reply was so good, I couldn't resist incorporating it along with Michael's piece to create a single feature, which I christened “Discrete Indiscretions.”

By this time, it was obvious that my latest brainchild had taken off full-tilt down a decidedly digital path. However, one thing was missing. All the articles were about digital audio—what about digital *video*?

Then I got a phone call from my old friend and colleague Dennis Barker, who was finishing an assignment I had given him several months earlier: a comparison of the latest Digital

Satellite System (DSS) products from RCA and Sony. “Great,” I thought, “A digital-video article just when I need one!”

However, as I began to read Dennis's article, I realized that I wanted to know more about DSS—much more. *SGHT* hadn't covered DSS in a long time, so it seemed like a good idea

to produce an in-depth feature on the topic. I had an RCA system installed in my home, and I proceeded to familiarize myself with this important new technology.

It's easy to become cynical when you cover an industry in which the only thing new about a so-called “new” product is its model number. Truly new and exciting technologies are few and far between. However, just as a child's delight in the world can help one see things from a fresh perspective, DSS immediately struck me as a bona-fide breakthrough.

This is a fertile subject. From a tiny kernel, my article grew... and grew... and grew... until I finally decided to split it into twin features. The first, “DSS: The Sky's the Limit,” addresses a number of fundamental issues, including video and audio performance, channel consistency, digital motion artifacts, “rain fade,” etc. It also incorporates Dennis Barker's Sony *vs.* RCA comparison, along with a description of DSS programming options. Immediately following this feature is “Bent Pipes in Space,” which explores the space-age digital technology that makes DSS tick.

Of course, there are many great articles in this issue that have nothing to do with digital technology. For instance, “Take Your TV on a Test Drive” is, in my humble opinion, one of the most useful and interesting pieces you're likely to find in any A/V publication.

As much as I'd like to take credit for planning this issue's “digital” focus, I can't. I simply guided and nurtured the magazine along its chosen path. But that's okay; parents and magazine editors must both get used to being surprised by their babies—it's an inevitable part of the growth process. **SGHT**



Lawrence E. Ullman

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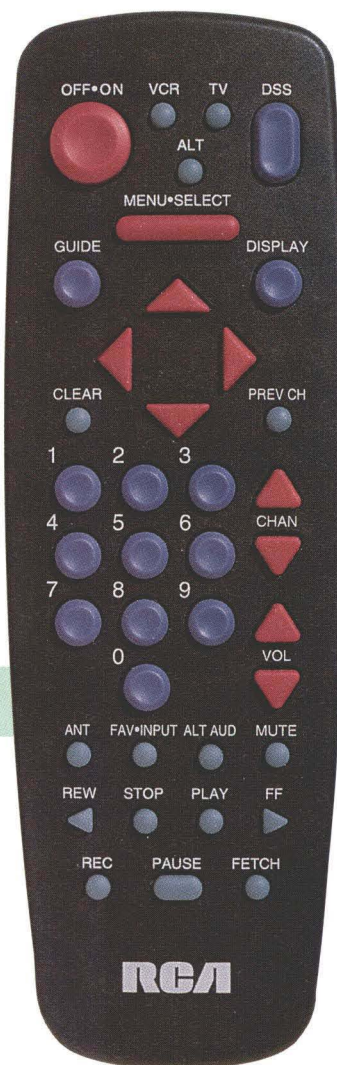
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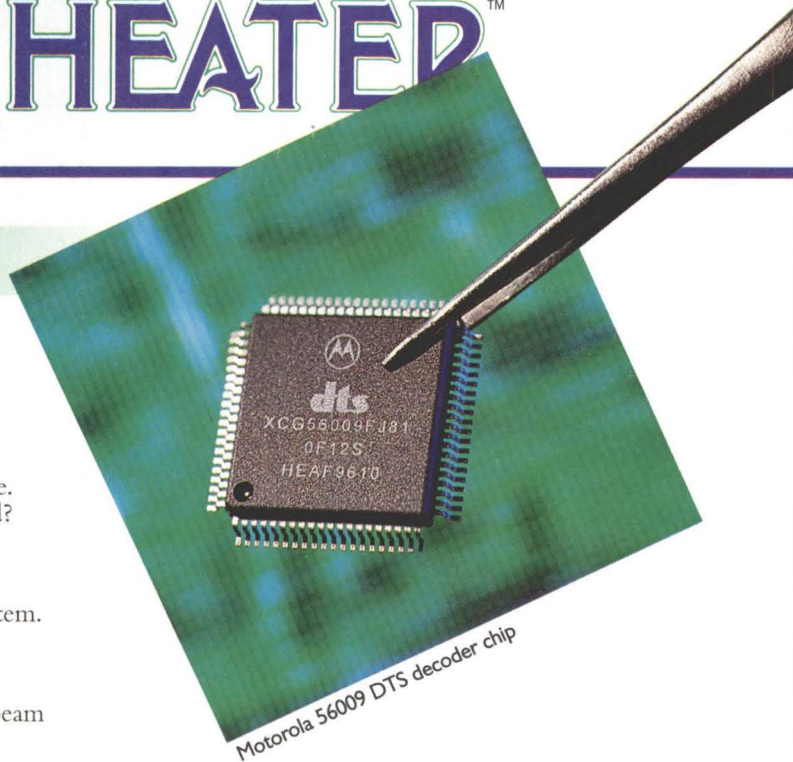
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Motorola 56009 DTS decoder chip

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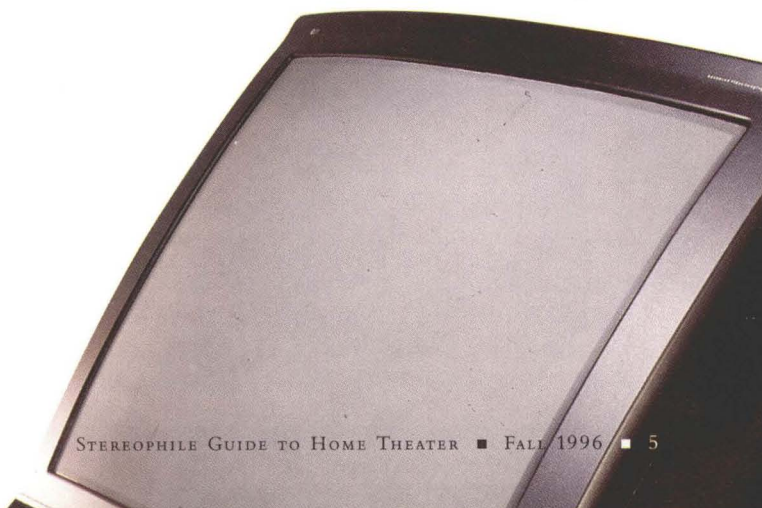
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Ever wish you owned a movie theater?



You'd sit in a different seat each time, with your feet up. The theater would only serve your brand of cola, and popcorn would come in one size — silo. If a movie had a great soundtrack, you'd have the projectionist turn it up until the booming bass made the plaster cherubs that ringed the high ceiling tremble.

At NHT, we've always known a big part of the magic of movies was in the sound system. And we've captured it in the VT-2, a no-holds barred home theater system that at the flip of a switch also provides optimal music performance. Designed for the latest digital technology, and with a built-in subwoofer, the VT-2 makes motion pictures come alive. So now you can come home to your own movie theater.

Or if you're like us, simply never leave.



WE'RE INSIDE YOUR HEAD.

THE LETTERBOX

All's well that ends well

Editor:

I just received my Summer 1996 issue of *SGHT* (Vol. 2 No. 2). Thank you again for publishing my letters "Pioneer Update" and "Pioneer Problems" (the latter in the Spring 1996 issue). I wanted to give you a further update on my Pioneer Elite Pro-98 PTV discussed in my previous letters.

I took your advice and had my Pro-98 calibrated by a trained ISF dealer, Pat Hickman of Audio Video Environments in Tualatin, Oregon. I must say that in less than two hours Pat performed a "miracle" on my Pro-98. It was like watching a neurosurgeon perform brain surgery! Not only was the color temperature adjusted too high (9200° Kelvin), all the factory settings were way off *A Video Standard* recommendations.

This is the best \$200 I have ever spent. I strongly recommend that anyone serious about home theater have their monitors/TVs calibrated by a trained ISF dealer. I just wish Pioneer would have calibrated the Pro-98 to ISF/SMPTE standards in the first place. When calibrated correctly, the Pro-98 has a stunning picture. It's like comparing mid-fi to hi-end sound.

Thanks again for publishing my letters, and keep up the excellent magazines (*SGHT* and *Stereophile*). I hope to keep the record of having the most letters published in *SGHT*.

Lee F. Winer

Lake Oswego, OR

Breath of fresh air

Editor:

I would like to take this opportunity to congratulate you and your staff on one of the best audio/video magazines to come along in a long time. I have subscribed to many audio (and some video) mags over the years; I currently subscribe to five magazines; and I can't remember when I enjoyed one as much as I do *SGHT*!

I was not a charter member, but I have since purchased all three of your currently available volumes. The only negatives I see are: 1) you need to do a monthly issue; 2) each issue is getting smaller—e.g., Vol. 1 No. 2 is 234 pages, Vol. 2 No. 1 is 146 pages. But nit-picking aside, I enjoy your easy-to-understand articles. Your reviews are informative, describing the product and how it sounds, while not getting so overly carried away with technical jargon and B.S. like your parent magazine, *Stereophile*.

I am a subscriber to *Stereophile*, and have

been for five years or so. My subscription runs out in May, and I don't plan to renew it. I'm tired of reading about mega-bucks equipment and speakers, equipment you can't even find unless you live in a major U.S. city, and reviews that are so exhaustive and technical that they are boring. I notice that many of your contributing editors were (and are) on the *Stereophile* staff, but at least the reviews in *SGHT* are well written, with just the right balance.

In fact, I'll make a prediction that you will eventually become a monthly, and you may even have more subscribers than *Stereophile* has. Your magazine is a breath of fresh air. Keep up the excellent work, and I will subscribe to your magazine forever! Just thought you might like to know what some of us think of your product...

Alan Gaunt
Spokane, WA

SGHT Down Under

Editor:

I recently purchased a copy of your Fall 1995 issue (Vol. 1 No. 2) from one of my local news agents. What a wonderful surprise! I am a hi-fi "nut" and religiously buy every hi-fi magazine I can from around the world, but yours was far and away the best I have ever seen concerning home-theater products.

Every article, even every advertisement, was wonderfully presented and informative. I always feel that I have gained some further knowledge each time I read the issue.

Unfortunately, all my attempts to find a copy of your inaugural issue have failed, and I cannot find anyone here in Australia who can help me. I would appreciate it if you could let me know how I might go about obtaining a copy of

We regret that resources do not permit us to reply individually to letters, particularly those requesting advice about particular equipment purchases. (We are also unable to take telephone calls regarding equipment purchases.) Although all letters are read and noted, only those of general interest are selected for publication. Published letters are subject to editing, particularly if they are very long or address more than one topic. Please include your name, address, and daytime telephone number.

Please write to: The Letterbox, *Stereophile Guide to Home Theater*, 208 Delgado Street, Santa Fe, NM 87501. Letters can also be faxed to (505) 983-6327 or E-mailed to UllmanSGHT@aol.com.

Vol. 1 No. 1, and how much that might cost. I would also like to have a subscription for further issues if possible.

Terry James

Frenchs Forest, NSW, Australia

Sorry, but we are sold out of Vol. 1 No. 1. International customers can order other back issues and subscriptions by calling Molly Crenshaw at (505) 982-2366; fax orders can be sent to (505) 989-8791. International subscriptions are \$40, including postage. —LEU

I shoulda known better!

Editor:

I was shocked to learn, in your review of the Yamaha RX-V2090 (Spring 1996), that Yamaha can lay claim to being the "only audio-equipment manufacturer that makes musical instruments."

Far superior to Yamaha instruments are the digital pianos, organs, and keyboards from Technics, a company that I believe also makes audio equipment! Your reviewer should know his subject better before he makes bold, sweeping, erroneous statements.

Darrel G. Reid

Prosser Piano & Organ

Everett, WA

Actually, as a former product specialist for synth giant Roland and consulting editor for Electronic Musician magazine, I should certainly have known better! What RH should have said is Yamaha is the only audio-equipment manufacturer that also makes acoustic musical instruments. —LEU

DSS: No thanks!

Editor:

Thanks so much for your magazine, *Stereophile Guide to Home Theater*. It came just about the time when I was ready to upgrade an existing stereo system to my first home-theater system. It's been a few years since I subscribed to *Stereophile*, which I sadly let expire while I was going back to school to get a master's degree and then start a new business. I was happy to see that *Stereophile* was moving into home theater just about the time I was re-entering the home-entertainment arena. (I've got some money to spend again, finally.)

Anyway, about six weeks ago I was fortunate enough to find a local dealer (ProHome Systems in Oakland, Calif.) who took the time and interest in trying to find a match for my present system at a price that fit my budget. They did a good job of selling me new floor models and trade-ins to give me a home-theater system that—except for screen size (the TV is a 51-inch Pioneer Elite Pro-98)—offers

AV-600 THX PREAMP/TUNER:

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"The combination of the AV-600 and five MA-500s produced a remarkable sense of envelopment and immersion in the soundtrack."

Robert Harley, Stereophile Guide to Home Theater, Summer 1996



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"The AV-600's surround performance was the best I've heard on my system."

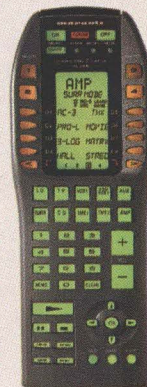
"The AV-600 is very well thought-out and loaded with intelligent features..."

"In both music and home-theater rooms, the MA-500s were impressive."

Robert Harley,
Stereophile Guide
to Home Theater,
Summer 1996

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the Future of
Surround Sound

All You Need is One



Get total control and complete convenience with the new Marantz RC-2000 Learning Remote.

more enjoyment than any movie theater I've ever attended! I only had a couple of issues of *SGHT*, but even these helped with the lingo and some crucial areas for me to look at and listen for—thanks.

I want to share my experience with the RCA DSS system. In a word, it's just not what they hype it as. RCA and USSB (a DSS service provider) consistently use the following quotes: "laserdisc-quality picture" and "CD-sound capability." This is pure, fraudulent advertising.

Actually, I was directed to consider DSS by the Pioneer technician who came out to my house to set up the Pro-98. Since I was intrigued by the ads promising great sound and picture, I gave USSB a call. Right off they gave me what later turned out to be woefully underquoted prices for monthly service fees. Feeling that the price was right (I was comparing USSB figures with my usual laserdisc/video-rental charges for a month), I went ahead and purchased a DSS system, thinking I would actually save a few dollars and have the convenience of not having to drive to the local video store.

The next 10 days were straight out of Dante's Hell. Trying to install a DSS system is no easy task if you happen to have a tree that is kind of blocking, but not completely, the intended direction. I didn't realize that I needed to have an *absolutely* clear view. After much major limb pruning, and installing the dish in a total of four locations (the last being on top of a pole buried in three feet of concrete), I finally got a good signal. I was little prepared for what happened next, although because of my huge investment in effort and expense I *really* wanted DSS to work!

First, for all channels except the advertisement for Direct Ticket pay-per-view, the picture quality is comparable to "OK" broadcast TV. In fact, since getting rid of DSS, I've finally installed an outdoor TV antenna (on the very nice pole I installed for the DSS dish) and the picture quality of live news shows, for example, is *far* superior to even the best DSS had to offer.

I had already seen quite a few laserdisc movies by this time with my new laserdisc player, and can safely say that screen resolution (i.e., the ability to discern detail such as credits at the end of the movie) for DSS is worse than broadcast TV and only slightly better than VHS rentals. Color saturation and apparent brightness and contrast seem worse than video (VHS or LD). This bummed me out to say the least, but not nearly as much as the sound quality, which can be described as "TV quality" at best.

The first night I watched *Stargate*, there was *no* bass! In fact, most movies had little to no bass whatsoever. So much for "CD sound." Another interesting anomaly was *no* center-channel information, which made listening to dialog difficult. I never heard this lack of center-channel sound again, but I noted several movies that had weird, phasey surround effects, such as exaggerated surround information or stereo information, blurred center-channel sound, etc.

At this point I really didn't want the DSS system anymore. USSB's technical support people, although understanding, could offer no help or hope for improvement. Then I found out the real monthly cost, which is *much* more than I ever spend on videos, plus the initial investment of about \$700 for the hardware. Thankfully, Good Guys "allowed" me to return the system for a full refund. (I say "allowed" because the salesman didn't tell me that normally they do not take back DSS hardware at all—I got off on a technicality.)

I have since seen "white papers" on the Internet related to DSS. Apparently, everyone knows that it doesn't deliver laserdisc picture or CD-sound quality. As one paragraph summed it up, DSS quality is a complex issue that can change with the second-by-second complexity of the various channels and pictures transmitted and the overall compression efficiency, but the best criteria to judge it by would be a bit transfer rate. The article went on to say that the very best direct-feed movies (which USSB doesn't even offer, only retransmitted HBO, Showtime, et al. satellite feeds) may have 3 Megabits per second (Mb/sec), whereas LD has between 4–6 Mb/sec and digital studio [video]tape has 8 Mb/sec.

So if you're looking for quality picture and sound from DSS, forget it for now. Admittedly, I never had or needed conventional cable TV, so I didn't compare it to that for picture or price. Perhaps this comparison would be more fair than as a competitor to rental tapes or discs.

Chuck Belanger
Richmond, CA

P.S. Why not allow E-mail for these letters?

My experience with DSS—which is detailed at length in "DSS: The Sky's the Limit" and "Bent Pipes in Space" in this issue—has been utterly different from yours. Your installation difficulties are a good example of why I strongly recommend having a DSS system professionally installed; a competent installer would have saved you a lot of sweat and frustration!

The Internet postings you quote are correct in stating that DSS's performance varies based on

program content and other factors (see the aforementioned articles). I also agree that USSB's "Premium" movie channels do not show DSS off to best effect. However, some of the bit rates you quote sound suspicious. Since the video on laserdiscs is in analog form, I have no idea how the "4–6 Mb/sec" figure was arrived at. (The digital audio tracks on an LD have a transfer rate of 1.4 Mb/sec.) And if by "digital studio videotape" you mean the Digital Betacam D1 format, that requires a transfer rate of 270 Mb/sec, not 8 Mb/sec.

Letters can now be submitted to my E-mail address, which is UllmanSGHT@AOL.com

—LEU

The Big Country

Editor:

I hope you at *SGHT*, my favorite A/V magazine (you put more emphasis on equipment tests and less on flashy format), will make the effort to examine, review, and perhaps feature in your "20 Hot Laserdiscs" section Image's new, long-awaited Letterbox Collector's Edition of *The Big Country*.

Okay, so there ain't no stereo here, but I think this release is worthy of special attention anyway. It may not be my favorite western, either, but I believe it is an underrated classic and the last of the monumental, big-budget, "Golden Age" western epics to get the deluxe laser treatment. And if you don't believe me, ask Martin Scorsese, who once volunteered to help restore the Wyler film. The Technirama compositions are gorgeous, Jerome Moross's score is beloved by millions, the extras are neat (the commentary might have been beefier) and the price, I believe, is right! A. J. Lehe

Talladega, AL

A dark and stormy Pioneer

Editor:

I want to warn your magazine and its readers of a potential serious design defect that seems to be inherent in all Pioneer Cinemawide rear-projection television sets. This defect causes considerable image degradation to most video input sources in the form of a significant darkening, shadowlike effect in scenes with complex lighting situations. I am an unfortunate owner of one such unit (SD-P5071).

Within the first week of use, I began noticing a "darkening" effect on the displayed image during scenes that were not well lit. The problem occurred on a variety of material regardless of the video source. My system setup includes two laserdisc players (Panasonic LX1000 and Pioneer CLD-D703), two S-VHS VCRs (Mitsubishi and JVC), a C-Band satellite



The PAV is the first audio/video product ever certified for its video excellence by



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receiver (Uniden), a Kodak Photo CD player, and an RCA DSS system.

Hoping that this problem was related to the so-called "burn-in" period that most televisions—projection or otherwise—require, I did not immediately complain. I have owned a Mitsubishi 45-inch PTV and an RCA 46-inch PTV previously and I still use the RCA unit for comparative purposes. (All sets have been professionally calibrated to the D6500 color temperature.)

Needless to say, the Pioneer's problem did not go away. The shadowing problem does not usually occur during bright scenes regardless of the source. It also does not distort the image when it does occur. The shadowing effect follows objects in a particular scene and can be readily seen from the left edge of the screen all the way to the right edge whenever visible.

If the object in question is six inches tall (a talking head, for example), then the shadowing/darkening effect—which begins immediately to the left and right of the object—is also six inches tall and moves up and down with the object. The effect almost looks like something superimposed on the image. It is "black," not red, green, or blue. No amount of adjusting the brightness or contrast or any other control will correct (or even affect) this problem.

In my own effort to rule out potential causes, I have separately reconnected each component to the projection set—the problem still persists. The identical image can be played back on my RCA 46-inch PTV without the slightest hint of this shadowing effect. I have placed both TVs side by side for such a comparison. This may sound like a power supply problem, but Pioneer has replaced the Power Supply with no effect.

Recently, I have discovered that only Pioneer-manufactured laserdisc players seem to be immune from this form of image degradation. I am forced to wonder if these Pioneer projection units have compatibility problems with non-Pioneer components. The demonstration unit at the store (another SD-P5071) did not display this problem—but it was being driven from a Pioneer laserdisc player. Upon switching sources to a non-Pioneer S-VHS VCR, the problem became very evident. I have since seen this identical problem on the SD-P5575 as well as Pioneer's 80-series units.

Is this an indication of a design defect in the television, or is it simply a manufacturing defect that occurred during one particular production run due to faulty components? (I certainly hope the set is

not supposed to do this intentionally.)

I have contacted the local Pioneer authorized service center regarding this and they have come to my home on four separate occasions to try and fix the problem. The attending service technician concurred with my observations that a problem existed, although he did not know how to correct it. The service technician has been in contact with Pioneer of Canada, and so far, all attempts to fix the set have been unsuccessful. I have also spoken with the POC Service Manager directly as well as his counterpart at Pioneer America.

Every disc in my 380+ collection produces the darkening effect, so I doubt my software is defective in some way. Every program from every source will exhibit this problem given the right conditions. A disc that easily demonstrates the darkening is the recent THX AC-3 full-frame version of *Top Gun*. It occurs in every second scene, if not the entire film, when using a non-Pioneer player.

What is the next step in getting this unit repaired? I have given up on Pioneer of Canada, as they have informed me that all units are like that (intentionally or not) and they are not willing to do anything more to solve the problem. Pioneer has admitted that this is a problem with their projection televisions and yet they are unwilling to fix it? I have even asked them to take the set back to their shop to troubleshoot the problem, but they have declined. And I am now stuck with an almost unwatchable television. At least I still have the excellent RCA unit to use.

I really enjoy the images from the Pioneer television when the darkening effect is not present, but the images can be unbearable once 1+ occurs. This problem does not represent itself as a minor screen glitch—it is clearly visible and can be seen on 80% of the screen given the right (wrong?) conditions. If I had known that all Pioneer projection sets had this particular design defect (if it truly is a design defect) which could not be corrected, I would obviously not have even considered purchasing the unit in the first place.

I would greatly appreciate it if you could warn your readers about this problem so that they do not make the same mistake that I made in purchasing a Pioneer PTV. If they are considering a Pioneer set, please have them check the set against other, non-Pioneer video sources. Thank you.

Michael Chen
Edmonton, Alberta, Canada
I can think of no reason why this problem would occur only with non-Pioneer video

sources. I experienced no such effect when driving a Pioneer SD-P5075K—a 51-inch set similar to your model—with a Panasonic VCR during a review for another publication a few years ago, and Tom Norton reported no similar problems with any of the Pioneer Elite models he has reviewed. Anyone out there have any suggestions for Mr. Chen?
—LEU

Overkill

Editor:

I recently purchased a Sony PVM-3230 32-inch color video monitor (which draws 220 watts) and a ST-92 TV tuner (20 watts).

The dealer is trying to sell me a unit that cleans up the AC power supply. They are recommending a Panamax Max 1000+ that for only \$250 is supposed to do everything in one unit. However, another dealer says I should buy a Power Wedge 1118 for \$1159 or a Tice Power Block Signature 111A for \$1219.

I only want to plug in the TV monitor and tuner. It seems like overkill to buy the Power Wedge or Tice units. Perhaps you have more information?

Archie B. Wood
Pasadena, CA

I've used a Panamax Max 1000 for my video gear for over three years; it's definitely more than adequate for your TV and tuner. The other devices supposedly confer some sonic benefits in a high-end audio system, which—whether true or not—is irrelevant to your needs.
—LEU

Toshiba TV tale

Editor:

Several weeks ago, I purchased a Toshiba CN32E90 "Cinema Series" 32-inch direct-view TV. This is the 32" version of the set that TJN currently uses as a reference (the CN35D90).

Right out of the box, I noticed a severe horizontal distortion at all four corners of the picture tube, causing an obvious "bow tie" effect immediately apparent on material with straight lines across the bottom or top of the screen (widescreen movies, ESPN or CNN grids, etc.). The retailer's own technician came to the house and made several yoke adjustments, which caused some improvement, but the set was still obviously distorted. He pronounced it an "excellent picture" and stated that all sets have some distortion of this type.

My retailer cheerfully replaced the set, including delivery and pickup of the old one. The replacement had the same type of distortion, albeit only at the top left corner of the tube. I thought it might be worthwhile to have the set looked at by another technician, who diagnosed the

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malady as a "pincushion" problem, caused by magnet misalignment.

I transported the set myself to the shop, assisted by a good-natured neighbor who is easily bribed with a quality microbrew. The technician called me back a week later to inform me that my set was in perfect alignment and ready for pickup. After transporting and setting up the set back home, I was dismayed to discover that the problem was only slightly better, if at all.

After another call to the retailer, a third set was delivered. This one was perhaps the worst yet—all horizontally linear material looked like a roller-coaster track. Well, that was the last straw. I now have a Sony KV-32XBR45, which is performing beautifully. As for Toshiba—in my experience, problems like this are caused by poor quality control and/or sloppy assembly procedures. (I should note that the picture was superb in all other respects.)

I would advise all potential Toshiba buyers to carefully examine their sets for horizontal line distortion. In closing, allow me to express my gratitude to my retailer (The Good Guys), who certainly lived up to their name in my case. And thanks for your excellent new magazine—the "Blues in the Night" article was very educational and informative.

Ken West
kwest@ix.netcom.com
Santee, CA

System reviews atypical

Editor:

I was happy to see the review of the Citation 70 processor in the Summer 1996 *SGHT*. J. Gordon Holt says the system "outperforms all the others I've reviewed" and "will provide still more aid and comfort to those who are convinced it's impossible to get true high-end musical performance from a THX home-theater system."

I gather his comments refer to the system as a whole but, since its components are available separately, I am wondering how they stack up. Given my interest in the Citation 70, I would like to know how it sounded as a straight music preamp as well as a surround processor. Perhaps substitution into Mr. Holt's reference high-end music and home-theater system would be helpful to those considering the purchase of, say, the Proceed PAV or Chiro C-800.

Trying the Boulder 250AE power amps was useful, but it might be easier to recognize the Citation amplifiers' strengths and weaknesses by substituting them into the reference home-theater system. It would have been nice to know

whether the Citation 72 LCR had any horizontal dispersion problems when used as a center channel. Given its price, I would hope not.

Most people I know select their high-end audio and home-theater components from more than one manufacturer. I note *SGHT* does likewise in its Recommended Systems. Unfortunately, the system-review approach provides little sense of individual component performance. I noticed the same problem when *Stereophile* reviewed systems from Spectral and Cello. System reviews are only optimal if the reader intends to purchase the entire system—probably not typical of your reader.

Moving on, I am very happy with the greater depth of evaluation in this latest *SGHT*. I also appreciate the investigative reporting on new technologies and products. Issues like missing component-video support on DVD players are important, and I, for one, would love to see the inclusion of DTS 5.1 on video DVDs. I gather there will be no synthesized Pro Logic digital output, leaving only an internal DAC—disappointing. I wonder if that decision was based on technical (perhaps difficulty generating 44.1 kHz data) or marketing reasons (maybe avoidance of direct comparison with LD). I now look forward to the first equipment review that actually mentions the reference video interconnects.

Trevor Storey
Newark, DE

He's out of here

Editor:

When I sent for my "Free Issue" of *Stereophile Guide to Home Theater*, I had certain expectations.

Okay, I admit, the last time I forked out money for a *Stereophile* subscription was in 1971–1972. However, did J. Gordon Holt have a stroke? Develop a seizure disorder? And who is Thomas J. Norton? Is he related to Julian Hirsch?

Let's face it, in 1971, J. Gordon Holt would have written a review of the Chiro C-800 THX processor so hot it would have BLISTERED PAINT!

Oh well, it was worth a shot. Forget about sending me another issue. I'm out of here.

Leonard F. Asbury
Mariposa, CA

Although his byline is absent from this issue, J. Gordon Holt is alive and well and working on several reviews that will undoubtedly blister something. As for TJN, I have it on good authority that he is not related to Mr. Hirsch in any way, shape, or form.

—LEU

No sexual connotations

Editor:

Regarding Dr. Freifeld's letter in your Summer 1996 issue ("Sexual Connotations"), I showed the Spring 1996 cover that he found so offensive to several of my friends. The verdict: 7 to 0 for *not* offended. Nobody thought there was a sexual connotation meant. Either Freifeld has a very dirty mind that sees sexual connotation everywhere, kind of like Beavis and Butthead, or else he is just too delicate to read a magazine like *SGHT*. Please do not censor yourself for people like Freifeld; that would really "suck."

P.S. On the Summer '96 cover, "4X" certainly has a sexual connotation, as does "unveiled" if you live in Iran or Saudi Arabia.

Bob Poling
Stow, OH

Point-person

Editor:

Just wanted to say thanks for an excellent publication; it seems to be getting better as it "breaks in." It's nice to see that the dyed-in-the-wool audiophile crowd hasn't prevented the magazine's launch or growth. While stereo audio is still the only good way of listening to music (for now), I see no reason not to embrace home theater. It's like vanilla and chocolate—some people only like one or the other, but most people can and do want to appreciate both! I have only a few comments that I assume will get worked out over time, but I believe require some attention.

I was somewhat startled by Wes Phillips's review of the Celestion *Style*-series speakers in the Summer 1996 issue (Vol. 2 No. 2). His overall conclusion seemed to be "good enough for movies; so-so on music." Having heard the system only once, my conclusion would have been "good enough for the masses, not good enough for our readers!" (NHT's SuperZero/SW1P combo is less expensive and higher quality.)

I've noticed in *Stereophile* as well that your writers are extremely picky about expensive gear, yet are amazingly forgiving, at times, of low-priced gear. Canon, Celestion, and RadioShack speakers come to mind as well as the RadioShack CD-3400 [portable CD player], all of which are strictly mass-market, appliance-quality gear. (Okay, the 'Shack speakers have some design potential, but the Canons are total garbage!)

I don't think a product that doesn't perform with music qualifies as *SGHT* material unless it is *sooo* good on movies that it totally overrides its failure to reproduce music (how the two could be

mutually exclusive still confounds me). Most people can't own separate systems for music and movies, so a product really needs to do both well to get any kind of recommendation!

I still miss Corey Greenberg's holier-than-thou, convinced he's right, willing to offend anyone at any time, calling a spade a spade forthrightness! Thank goodness for that *other* magazine.

Point #1: Please be more critical, especially with low-priced stuff, because there are some truly great inexpensive products hiding behind the marginal stuff that you let pass inspection.

Having looked at *Stereophile's* latest "Recommended Components" issue (April 1996, Vol. 19 No. 4) I was surprised by how the products stacked up in the Home Theater section (which, by the way, should be in *SGHT*, not *Stereophile*!). It seems as though everything below Class A was thrown in at random.

For instance, the Kenwood THX system in Class B? I really doubt it. Unless Kenwood has made some *serious* engineering strides in the few years since I sold the brand, they've never been able to build anything near that quality. I prefer to believe that it is a misprint—perhaps Class C or D was the true destination? I

still can't believe that a Kenwood receiver (Class B) outperformed a Denon (Class C)—that has never happened in my reasonably extensive experience!

Nor have I heard (yet) any other \$3000 dedicated home-theater speaker system in the quality range of the NHT VT-2 system (Class B). Both the Parasound P/SP-1000 (Class D) and the B&K AVP-2000 (Class C) are on the same level—I think your Parasound unit had a malfunction, especially since my demo unit is as quiet as the best surround processors in its price range (6-inches from speaker for audible noise). I also believe both are worthy of Class B, as that class stands at the moment, and they both deserve a \$\$\$ regardless (the B&K has had a major software/remote control upgrade as well). The Parasound and B&K are a full level above the NAD 917 (Class C), which is a great value for a full-function preamp/tuner/processor, but is still not in the same league as these more expensive units—I sell all three (thrice blessed?).

The PSB 100C (Class C for only \$180?) is a phenomenal performer and a great value, but is a PSB Alpha (Class E) level component that should be more realistically placed to avoid confusing people—perhaps Class D as surround com-

ponents go. I also find it hard to believe that the Infinity Compositions (a true design *faux pas*) has either the bass, quality, or dynamic range to achieve a Class B \$\$\$ rating! I know Bob loves these speakers (I haven't heard them, but have heard nothing but lukewarm reports from those who have), but if these sound good, Infinity has broken or bent the rules of physics to make it happen!

I also think that multichannel amps, surround preamps, receiver/integrated amps, and center speakers deserve their own categories.

Point #2: There needs to be more consensus building and more direct comparisons to known references before products are ranked. Perhaps the new *Stereophile* listening rooms will aid in this, and getting all your reviewers to move to Santa Fe wouldn't hurt either!

My last point is related to the above point, but the NAD 713 review made me want to be more specific. The 713 is a good basic receiver. It is, however, a mixed bag. First, it is a product that was rushed to market since NAD engineers were busy with about a dozen high-priority *stereo* products for the ever-lovin' faithful—the 713 is a Band-Aid until a better-designed product is developed.



Second, it uses a mediocre surround processor that is no competitor for the Analog Devices chip that it should use. Third, its circuit boards and other component parts are not typical NAD level quality.

Its sound is not bad, just simply average—not quite up to *SGHT* (or NAD) standards. On the other hand, it is the simplest, easiest to use receiver with the best-designed front panel (although the remote is average) I have ever seen. And though you panned the Controlled Dynamic Range, too much dynamic range is the single biggest complaint about movies and TV from normal folks who want to watch a movie, not go on an audio roller-coaster ride!

In short, the 713 is the receiver of choice for your technophobic, non-audiophile friends or family—certainly what I would give to my parents, who are much more picky about ease-of-use and lack-of-intimidation factors. I guess I was surprised it got such a nice, sugar-coated recommendation since it is not the product for technology-loving, sonically demanding audiophiles.

Point #3: *SGHT* editors are largely just making the transition to home theater. I recommend that your editors call or visit specialty audio/home theater dealers for some serious recommendations so you can get

some good reference-level products at various price ranges under your belt—quickly!!!

A few free recommendations for review: Sherwood Newcastle R-500 receiver, (\$550) with Analog Devices circuitry and improved componentry easily outperforms anything in its class. Sherwood also designs and builds most Harman/Kardon products for H/K—oops, trade secret!

NHT SuperZero/SW1P (\$1100): sure it's been done, but you should have it as a reference. NHT SW-2Pi: *much* improved over the original! The NHT SW-3P: review it with a set of Magnepans or electrostatics and see what happens! Parasound P/SP-1500 processor (\$1500) and HCA-2003 3-channel 200W amp (\$1650)—they should be killer. Onkyo 828THX receiver (\$1500), a shoe-in. The new B&K AVP-4000 Motorola-based preamp/processor/tuner with coax digital input (\$1700). B&K AV5000 5-channel 105W amp (\$1100) great for electrostatic/planar speakers!

I may be somewhat biased [*Oh, really?—Ed.*], but these are/will-be excellent products and I didn't see any of them mentioned as a Class K recommendation—they definitely deserve reviews. Also, in the too-lame-for-review category: 6-

channel amplifiers, bipolar speakers, and dipolar rears—dumb, dumber, and dumbest. The movies should contain dinosaurs, not your home-theater system!

Have fun, wish I had your job (less stress)!

John Ashman

Audio Designs LTD

Albuquerque/Santa Fe, NM

Point No. 1: *Kenwood* has indeed "made some serious engineering strides" in the last year, and is now producing a number of superbly engineered, superior-sounding products.

Point No. 2: It's always dangerous to recommend—or dismiss—a product or brand you haven't heard.

Point No. 3: *SGHT* plans to institute its own "Recommended Components" scheme with ratings better attuned to the home-theater market in a future issue.

Point No. 4: Less stress? If only you knew...

—LEU

They can't both be right!

Editor:

I was interested to read the views of your correspondents on the upcoming DVD format in the Summer 1996 issue. However, the comments are often puzzling and contradictory. TJN, on the DTS system, says that "AC-3 leaves the stereo digital tracks available to convey the

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matrixed Dolby Surround information." A couple of pages later LBJ says: "Dolby Surround will not exist as a separate track laid down on the disc; it will be derived from the 5.1 channel digital mix." These two statements cannot both be right!

As for AC-3 having a "commanding lead" over DTS, as TJN puts it, so would a Fiat if it set off two hours before a Ferrari, but then watch out!

With regard to 4:3 and 16:9 versions of a film on DVD, LBJ muses that these two versions would be included on the same disc, "one complete version per side." I don't think this is what is intended for DVD at all. I believe TJN gets it right in his sidebar, "Widescreen, Letterbox, and DVD." Specifically, the 4:3 and letterbox versions will be derived from the anamorphically squeezed image. Perhaps some editorial comment on these contradictory statements would have been in order.

My last point is regarding TJN's opinion that "only a few projectors currently on the market can unsqueeze an anamorphically squeezed signal." I thought that most, if not all, front projectors could perform this task by having the vertical height of the picture reduced by the necessary degree. Granted, not all projectors can memorize such custom settings for quick switching, but it can be done.

Gordon Lilley

Ottawa, Ontario, Canada

TJN's comments about DTS are in relation to DTS-encoded laserdiscs; LBJ's comments are in relation to DVD. Both statements are indeed correct. As for DVD aspect ratios, in the sentence immediately preceding the one you quoted, LBJ said, "The new discs will offer movies in multiple aspect ratios, with instructions for pan-and-scan or letterbox decoded by the player. (Italics added.) He then goes on to say that "Producers may even have the option to record one complete version per side." At this point, when it come to DVD, anything is possible.

All projectors have width and height adjustments. However, they are designed to properly adjust the geometry during setup and may not have enough range to fully unsqueeze an anamorphic image. And even if the projector does have enough range, without an anamorphic test pattern you will have to guess at the correct settings. Finally, there may be other technical factors that make this a bad idea: Check with the projector manufacturer before attempting to adjust your unit so far out of its normal operating parameters. —LEU

The analog tracks are where it's at

Editor:

I was delighted with your most recent issue and I commend you for taking the

courageous step regarding professional monitor calibration to assure your readers of a consistent standard in forthcoming reviews of video hardware. I was lucky enough to have local ISF agent Jim Doolittle calibrate my Proscan 35-inch monitor right out of the box and, although I am now aware of other TVs that can reach an even higher standard of NTSC accuracy, I have been a delighted viewer ever since.

Regarding home-theater audio, I have long averred that the home theater and audio press are missing one of the best kept secrets of laserdiscs: the *analog* audio channels. In our quest to produce movie-like sound at home, we should bear in mind that—for movies made prior to, say, 1992—the analog sound tracks ALWAYS sound more like a real movie, and I don't care what kind of a razzle-dazzle DAC/processor you are using. (Try a head-to-head analog *vs.* digital comparison using the opening of the third Indiana Jones movie and you'll see what I mean.)

Furthermore, in the industry's headlong rush into 5-channel sound, let us not forget that important movie makers (Woody Allen, Stanley Kubrick) have not been eager to embrace *stereo*, let alone surround sound. A film like *Full Metal Jacket*, with its exquisitely designed mono soundtrack, simply could not benefit from stereo or surround. A film like *The Big Country*, which I'm sure your contributor Gary Reber would say had "undistinguished mono" sound, benefits enormously from the precise minimalism of the sound, adding to the psychological effect of the huge screen image and its own use as a storytelling device.

Like all your readers, I enjoy a good surround track in a modern film, but stereo or surround does not alone a good film make. One of your readers compared the multi-channel soundtracks of *StarGate* and *Forrest Gump*; no big fan of the latter, I could sit through *Gump* 100 times rather than be subject to the truly awful *StarGate*, no matter how much bass is walking around my room.

Richard P. Clancy
Ashland, MA

DVD is obsolete

Editor:

I am a salesman of video electronics and I believe that DVD is obsolete even before its fall debut. The first thing customers will ask is "Where is the record button?" If someone tries to argue the point that CDs don't record, it's because CDs are priced below \$19.99 (the maximum price for mass-market acceptance),

and high-end consumers won't tolerate digital video artifacts.

Remember what happened to Toshiba's digital televisions years ago? People asked for their money back rather than live with digital distortion of moving objects and animated films. Why are people going to abandon their artifact-free laserdisc players, which have thousands of movies available for them?

The electronics manufacturers' only chance was to offer a 2-sided, 12-inch DVD disc with 1200 lines of resolution with a new generation of TVs and projectors to display them. Instead they will offer the consumer a 5-inch disc with compression and insufficient space to store high resolution. The hot mass-market item will be satellite systems like DSS. These will doom DVD.

Why will people buy DVD, when for the price of a single disc they can get a month of multiple premium movie channels? They won't! DVD's only chance was either to record, thereby replacing VHS, or to have resolution far better than laserdisc. The days of introducing a new video format that won't record are over.

Laser survived as a niche market of quality and satellite offers all the movies anyone could want for \$35 per month. People will sit on the sidelines until digital videotape recorders replace VHS. I doubt that laserdisc owners will invest in DVD players of questionable picture quality when high-definition VCRs will make both obsolete. What's your opinion?

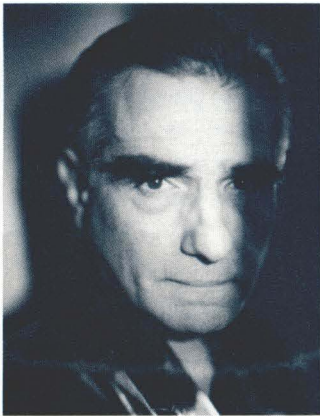
Terry Gambill
Des Peres, MO

Even if I were a gambling man, I wouldn't bet my money on DVD's chances for success—I'd risk my money on something more predictable, say, technology stocks. At the same time, I wouldn't bet against DVD, either. Like it or not, video is going to go digital in the next few years. DSS is already there. Whether DVD will be the "hard copy" medium of choice for movies and music is anyone's guess right now. What do you think, readers? —LEU

Black cat at midnight

Editor:

Can you say irony? The black background/white text of "Fade to Black" in the Summer 1996 issue can be used as a definition. I needed a "threshold of pain" light to read these words about keeping my room dark. I am aware that computer capabilities can overwhelm the artistic cravings of layout people, but it is your job to say no. It is bad enough that almost all audio/video components are black with small, gray letters designating the



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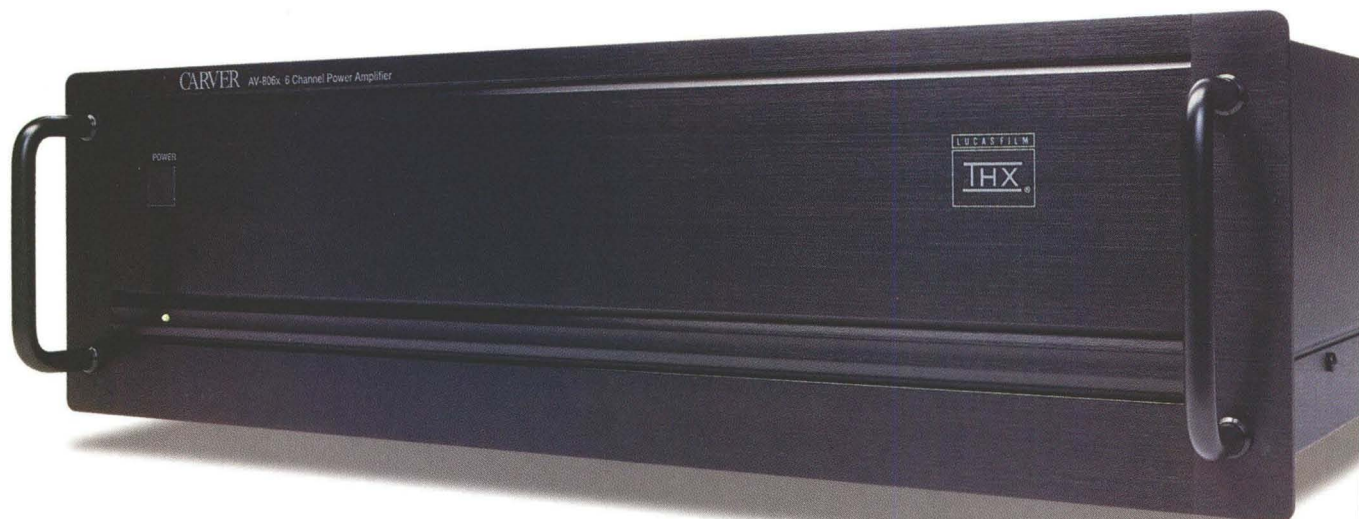
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**“I was expecting
competent
performance;
what I got instead
was magic.”**

*Thomas J. Norton
Stereophile Guide to Home Theater Vol. 1 No. 2*

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controls. Must we endure this user unfriendliness in magazines, too?

Let's hear it for "contrast radios" and "results that are plain to see" for text in magazines.

P.S. You missed a bet by not including an "I" word when you named your (usually) readable publication. Had you done so, your acronym could have been *SIGHT*. May I suggest Intelligent; Inimitable; Impartial; Inclusive; Independent... will someone please stop me?... Ideal; Irresistible; Inventive; Ingenious; Isodynamic... I knew I'd go too far.

Edward (Squinty) Claymore
San Francisco, CA

Immoral and irrelevant

Editor:

I find the full-page Cello ad that appeared in the Summer 1996 *SGHT* as well as other audio publications to be quite offensive.

There is no need to picture a woman's naked body in an ad to sell loudspeakers. This amounts to nothing less than soft porn. I have spoken to several other audio enthusiasts, and their reactions were quite similar to mine. It bothers me that I cannot leave my audio magazines on the coffee table for fear that young children may see this inappropriate material. I myself do not like this type of material, and do not want it in my home. It is sad that I can't even buy an A/V publication without exposing myself to offensive material.

The audio industry in general got over the "sex sells" mentality a number of years ago. I urge Cello to do the same. The photo they have chosen is immoral and irrelevant.

You can be certain that, like myself, there are quite a number of others who will not consider buying Cello products due to their choice of advertising material. There are certainly more creative ideas that could be employed, without offending your readership.

Please accept this as the constructive criticism it is intended to be.

Jon Taylor
New York

Shine some light on projectors

Editor:

As an avid subscriber to your excellent magazine (as well as *Stereophile*), I have gleaned much about, and considerably improved my knowledge of, audio/visual cinema projection. Sadly, on this side of the pond we are seldom treated to in-depth and incisive reviews of equipment; frequently, the reviews are superficial and more of a generalized conclusion, without much supporting detail (i.e., rarely

are full product details shown, as in *SGHT* sidebars, at the front of a review).

This is fine if buying a £300 amplifier, but not very satisfactory for either high-end or expensive equipment. Thus, buying according to reviews means buying according to the weight of opinion; in other words the product receiving the majority of recommendations. So I welcome the chance to take up your offer on page 65 of the Summer 1996 issue, and raise some questions and requests.

1. First, could you please comment on or, preferably, review—soon—the Electrohome ECP 3501. Nowhere have I seen any reference, let alone review, of this Canadian range of projectors, and I am seriously considering this model for my business demonstration purposes.

2. As light output is important and, possibly, the most difficult visual aspect to properly identify, it would be useful to have a table of the ratings for all projectors reviewed. It is confusing to read values in lumens for one product and ANSI for another; your contributors have used another, lower number rating in reviews. There needs to be a common standard (adequately explained) to facilitate meaningful comparison. Each projector needs to have a rating for projection on 6- and 12-foot screens.

3. I would like much more information, both technical and product, on scan quadruplers, and a statement on the minimum horizontal scan rate a projector needs to have to allow use of both doublers and quadruplers. Also, can we have an article on stacking horizontally and vertically two or more projectors to achieve even greater light output without increasing the average 7-inch tube arrangement.

4. Finally, I would welcome an "A" to "D" categorization such as *Stereophile* publishes for the audio equipment it reviews, for audio/video products.

John F. Jefferis

Wisbech, Cambridgeshire, England

We plan to review video projectors regularly, and hope to include Electrohome in a future issue. Your frustration about the lack of a common standard for light-output measurements is well-taken. Each manufacturer currently measures their projectors any way they want, using the method and unit of measure that makes them look best on paper. The president of a major projector company once told me that they simply add 50 to whatever figure their competitors come up with! It's a situation reminiscent of the days before power amplifier output measurements were standardized. Suffice it to say that this subject will be covered in a future article.

For line doublers, you need a projector capable of at least a 31.5 kHz horizontal scan rate; for a quadrupler, you need at least 63 kHz. For now,

home-theater audio products are currently included in Stereophile's "Recommended Components" issues. A similar grading system and feature will appear in SGHT once we feel we have reviewed enough components to make judicious comparisons and recommendations. —LEU

One Sharp projector

Editor:

While attending the Winter Consumer Electronics Show (WCES) in Las Vegas, I visited the Sharp display and was very impressed with their XV-S95U LCD video projector. Although your Spring 1996 issue made slight mention of the unit, you did not describe the major advance in brightness it provides.

Having looked for many years for a large-screen TV, I was so impressed with the Sharp's performance that I called my local stores in the Denver area from Vegas to order one ASAP. However, what I really wanted was a unit with a computer-type RGB input, which the XV-S95U lacks. None of my usual sources expected a "95U" until April 1996, and even if they could get one, it wouldn't have an RGB input.

When I returned to Denver I made several more calls in my quest to get my hands on the new Sharp projector. A local industrial representative had just received a demo-unit XG-E1000U, which turned out to be the RGB-equipped version of the 95U.

After reviewing this projector at home using a Da-Lite 106-inch diagonal screen, I was so impressed I purchased one. However, after testing three 1000Us and one 95U, I have found that each unit had major quality-control problems.

Nevertheless, based on my limited experience, and to paraphrase Scott Wilkinson (and Pogo): I have seen the future of large-screen home theater, and it is front-projection LCD. I also slightly disagree with Thomas J. Norton when he states in "On the BIG Screen" that, "At the present state-of-the-art, a CRT projector, dollar for dollar, produces a better picture than any LCD device."

My 1000U sells for about \$8000 (as does the 95U) and compares to a \$15,000 CRT data-grade projector with a \$10,000 or \$20,000 Faroudja line doubler. Based on the progress that Sharp has made in one year, I would predict even better pictures and much lower prices with future LCD projectors.

Howard S. Ingber
Denver, CO

We've been hearing good things about the Sharp XV-S95U—especially regarding its brightness—and are looking forward to reviewing the unit in an upcoming issue. —LEU

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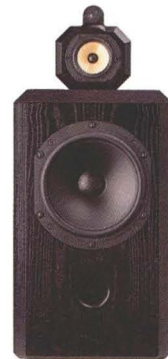
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Like the 801, the Matrix 805's bass/mid-range drivers are made of Kevlar - to eliminate resonance and minimize coloration, especially in the mid-range band. Even the aluminum dome tweeter is identical to the one used in the B&W Matrix 801, the loudspeaker used to monitor more than 80% of the world's classical recordings.

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For the name of a B&W dealer near you, call 1-800-370-3740. And hear how much the compact B&W Matrix 805 has in common with the legendary 801.



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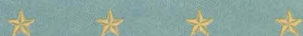
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I'VE ONLY HEARD THIS LEVEL
OF RESOLUTION AND
DYNAMICS WHEN THE QUAD
ESL-63S ARE RUN WITH
A SUBWOOFER."

LARRY GREENHILL

Stereophile

[Vol. 16 No. 4, April 1993]

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BEHIND THE SCENES

HOME THEATER NEWS & VIEWS

DVD Happens

By Lawrence B. Johnson

Assuming nothing puts the countdown on hold, a successful autumn launch of the digital video disc (DVD) format will depend on more than getting the hardware into stores on time. Everybody in the industry realizes that DVD players aren't enough: The discs themselves must be available in significant numbers and as handy to purchase as the players.

To that end, Thomson Consumer Electronics, maker of RCA-, ProScan-, and GE-brand products, has struck a deal with a software company it hopes will cover every bet—and Thomson is betting a lot on the success of DVD. Wherever Thomson-made DVD players are sold, consumers also will find an array of the new discs to choose from, supplied directly by Image Entertainment, one of the leading distributors of laserdiscs.

Image's laserdisc stable includes the entire group of Buena Vista (Disney) labels, but under its exclusive arrangement with Thomson, that stable broadens to include other heavy-hitters, such as MGM/UA, MCA/Universal, Columbia Tristar, and Warner. Outside the framework of Thomson hardware dealers, the big studios will market their own digital video discs, just as they now distribute their own laserdiscs.

Tremendous implications

The implications of the Thomson-Image deal are tremendous. Thomson, whose RCA brand holds the dominant share of both television and VCR sales in the United States, has some 14,000 outlets across the country.

"Without having the software available to customers at retail, right there in the stores next to the machines, dealers are going to have a tough time succeeding with the hardware," commented Garrett Lee, marketing director for Image and perhaps the most savvy marketing veteran of the laserdisc era. "It's simple. Thomson wants the consumer to walk out of the store with a DVD player and three or four discs."

Although consumers also are likely to

find digital video discs at familiar outlets such as Tower Records, Walmart, and Kmart, Thomson doesn't want to risk even that psychological distance between Point A (the player) and Point B (something to play on it).

As for the question of just how many titles may be available on DVD when the first machines hit the stores—a number that optimists have set as high as 400—Lee projected a fairly wide assortment of so-called "A" titles—major hits such as *True Lies*, *Jurassic Park*, and *Top Gun*, though he did not actually name any of those.

"I truly believe the discs will be here in late August (the earliest arrival date forecast for the machines)," Lee said, "and the figure that I've seen most recently is 250 titles by the end of the year. I haven't seen a definitive list of titles, only a proposed list the studios allowed Thomson to show to their dealers, to give dealers a sense of the type of product available at launch and to inspire confidence that this was going to be prime product."

Aggressive plans

Meanwhile, Matsushita (maker of Panasonic and Technics components) and Sony announced aggressive plans for mastering and pressing DVDs. According to a report in the April 29 issue of the trade journal *This Week in Consumer Electronics* (TWICE), Matsushita was planning a June opening for a new \$15 million pressing plant in Osaka that has the capacity to produce 600,000 discs each month. As demand increases, Matsushita expects to step production up to 1 million discs per month. In addition, Matsushita has formed a U.S. subsidiary to manage the editing, compression, and mastering of DVD titles. The new company, called Digital Video Compression Corp., is based in Los Angeles, and said to be capable of mastering as many as 40 titles a month.

TWICE said Sony will begin production of DVDs at its pressing plant in Terre Haute, Indiana, in September, with an initial capacity of 300,000 per month. The report said Sony expects to invest \$50 million in DVD-related manufacturing operations over the next two years.

Lee predicted the DVD catalog would continue to favor "A" titles even as

demand and production begins to grow. One big question, still unanswered, is exactly what form—or combination of forms—the DVD image will take: 16:9 anamorphic, 4:3 letterbox, pan-and-scan, or even all of the above on a single disc. "Nobody's been very clear about this," Lee said, "but one good possibility is a two-sided disc with anamorphic and 4:3 letterbox on one side and pan-and-scan on the other."

Such technical complexities, with the attendant factors of time and cost, could impede DVD's expansion into the classic-film catalog for several years, Lee said.

"Right now, the costs of creating a single DVD title are very great," he said. "We can do a film-to-laserdisc transfer of a classical-catalog title, say, *On the Beach*, for \$3500. But mastering a DVD is complex. It's not like they just twist a dial and a movie comes out the other end. You're dealing with a variable bit rate and at least four passes in real time to get all the information on the master. That drives up the cost of each new title to \$50,000 or \$60,000."

Laserdisc business as usual

Lee said he expected the laserdisc format, with its catalog of nearly 10,000 titles, to endure into the next century. "We and other companies will continue to offer laserdiscs in special editions. The creative community (film makers) is very laserfriendly. Many special editions are created at the insistence of studio heads and directors.

"Frankly, we're looking at laserdisc business as usual. It's going to be interesting to see what happens on the DVD side with Disney, Fox, and Paramount. None of them have committed to DVD. And you know who the early adopters of DVD will be—the laserdisc gang. Where it goes from there, I think, will depend on how fast the hardware sells through. That's what our arrangement with Thomson will help to ensure."

It may not take long for sales of DVD players to outstrip the installed base of laserdisc players, which Lee estimated at 2 million to 2.5 million. Catching up with the VCR is another matter. American households harbor some 85 million VCRs.

"I think DVD is definitely going to happen," Lee said. "After all, the 5-inch

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Mitsubishi Shows Off

By Thomas J. Norton

In mid-March, Mitsubishi rolled out their new line of televisions at a presentation in Atlanta. There were the usual spate of new features: a 6500° Kelvin color-temperature setting on many sets; new onscreen menus; reduced overscan (down to 5% on some big-screen models); a feature called "auto kine-bias," which is said to improve black level at different picture levels; and 5-point, user-adjustable digital convergence on some new large-screen sets.

A new 80-inch rear-projection TV (PTV) also joins the line. Seven-inch CRTs are now included in all the company's PTVs, except for a single 45-inch model and the new 80-inch set. The latter sports 9-inch CRTs. I was disappointed, however, to see no sign of a wide-screen (16:9) PTV in the new line.

Mitsubishi is also re-entering the audio business, with a determinedly mid-fi line of home-theater electronics and loudspeakers designed to fill the desire of a Mitsubishi customer for an all-Mitsubishi system.

Plasma display

By far the most interesting development, however, was the demonstration of a 40-inch, flat-panel, plasma-display television. Delivery is not expected until later this year or early next. Some technical problems remain to be solved; the display still lacks some contrast and "snap." Except for some bad pixels in the demo set, it looked to be salable to those well-to-do, early adopters willing to shell out an estimated \$8000 to \$10,000. It did not, however, look as good at its present stage of development as Mitsubishi's best conventional 40-inch direct-view set.

While a plasma display in a 40-inch size seems to me of marginal practical value, Mitsubishi sees 50- and 60-inch versions down the road. If the price can be brought down, such displays might well offer practical advantages over comparably sized PTVs. According to Mitsubishi, a 60-inch plasma display could well be a market reality by 1998.

Misplaced Passions

By Russ Herschelmann

Once you've done the research and bought all the gear, there's only one thing separating you from great picture and sound—your room.

Each year, Americans spend hundreds of millions of dollars on sexy new A/V gear, and not one penny on their play-back environment. Think about it. How good is the picture going to be on that new \$20,000 line-doubled widescreen TV in a room full of windows? And how good is the sound going to be in a room without acoustic treatments?

Not too good, Binkie.

A good acoustician will tell you that, sonically, what you put into your room is exactly what you get out of it. Ignore room acoustics, and the sound stinks.

"You're so wrong!" says the audiophile, "My sound and picture are spectacular!"

Oh, really? Compared to what? To your buddy's house—another guy who spent nothing on his room? To your dealer's showroom—a place that has concrete floors, buzzy, metal-stud walls, industrial-strength air-conditioning, and a flimsy drop ceiling? Get real!

How does your room sound in comparison to a great concert hall? Do you get that spine-tingling, hairs-on-the-back-of-your-neck-stand-up feeling when playing your home system? Do you marvel at the filmlike depth and clarity of the image your TV is producing?

Well? Do ya?

If you really want great sound and picture, you need to work on your room. Did you optimize the room's dimensions? Determine ideal seating? Calculate the standing waves? Work on reverberant characteristics? Measure the ambient noise levels? Insure proper light control and color palette? Install proper acoustical treatments?

If you haven't, isn't it about time you started?

You need help!

If you really want to optimize your room, you have two choices: Either start learning an awful lot about room acoustics and system calibration, or hire a professional. If you're a do-it-yourselfer, try to get some training at an event for professional installers, such as those organized by CEDIA, ISF, THX, or Habitech. Then plan on some extensive background reading: technical consumer

mags like this one, SMPTE and AES journals and reports, books on acoustics and room construction, and manuals on how to use associated test equipment (analyzers, comparators, etc.). Last but not least, you're still going to need to call on an expert, either to rent their test equipment, or for final checks and verification that you're doing everything right.

The biggest problem in hiring a specialist is finding one. Just because a guy paid 30 bucks to get a spiffy set of magnetic "Home Theater" signs for his pickup doesn't necessarily make him an expert. Look for someone with ISF, CEDIA, and THX training. Someone who owns—at the very least—test equipment, including a real-time analyzer, color analyzer, optical comparator, vectorscope and waveform monitor, and a device that measures room decay and reverberation characteristics. Once you find someone that has the necessary training and test gear, check out some of their completed projects. How good is the picture quality? What have they done to optimize the room's acoustics? Have them demonstrate what they've done, then sit down and look and listen.

Your local dealer

You'd think that your local A/V specialist would be the best place to find an expert in room acoustics and video reproduction. Ironically, most retailers are the last folks who will teach you how to optimize a room. Why? Because if they tell you difficult truths—for example, that A/V equipment looks and sounds better in a room without windows—they'll sell less gear.

Part of the blame rests on manufacturers, since they train the dealers in the first place. Instead of spending millions on an advertising campaign, perhaps a few thousand spent teaching A/V specialists how to optimize rooms and equipment would come to better use. What you hear instead is: "Our equipment is painstakingly engineered to work flawlessly in any room." In the short term, this Madison Avenue approach sells lots of boxes. But in the long term, it promotes mediocrity.

Not every A/V specialist or manufacturer falls into this "box-pusher" mentality. There are some renegade manufacturers who won't even let a dealer carry a product until they can set it up properly. And there are dealers who train all of their employees in proper room set-up. But in an industry so driven by passion for high performance, it's amazing how few actually put their passions before their profits.

SGHT

Shopping for a new TV?

If it handles well

on this test track,

it's definitely

not a lemon.

Russ Herschelmann

Some folks fall in love with a car the first time they see it on a showroom floor or as it whizzes by in traffic. Others read about the sexy new models in magazines, drawing vicarious thrills from the descriptions and photos. But for the true enthusiast, there is only one way to evaluate a new set of wheels: the test drive.

Ask any serious car nut about their favorite chariot and they'll wax rhapsodic about the car's handling, braking, and what happens to all four wheels in a tight corner. By the same token, ask an audiophile about his or her current set of speakers, and you'll hear about their epic quest for acoustic nirvana.

However, ask a home-theater buff about their video monitor and chances are you'll hear something like "It was on sale—I got a great deal!" or "I compared 10 different



Take your TV

on a Test Drive



TVs, and this one had the best picture.” If you ask just what they *mean* by “best picture,” you’ll get some pretty fuzzy responses:

“It was the brightest.”

“The colors are really punchy.”

“The tube is really flat, so the picture looks better”

“The specs creamed the competition”

This is the equivalent of saying you bought your new Ferrari Testarossa because the wheels turned really fast or it had a red cylinder head. These might be accurate descriptions of some of

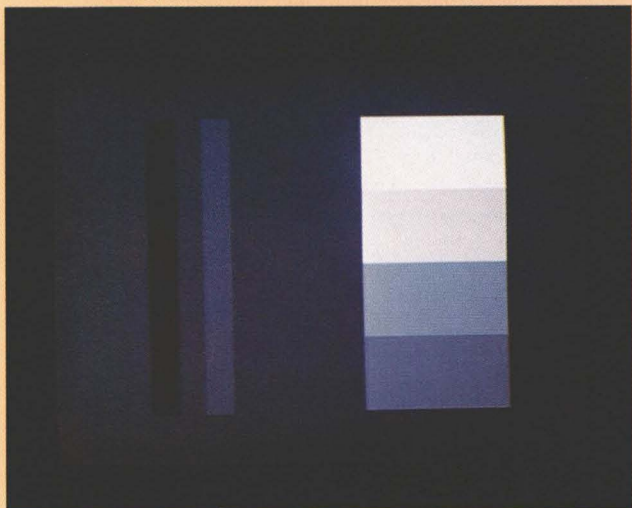


FIG. 1: Frame 50785 with brightness adjusted all the way up. Notice the vertical dark- and light-gray bars on the left side of the screen.

the Ferrari's characteristics, but they tell you very little about how well the car performs. Which leads us to our topic today...

The SGHT School of High-Performance Tube Driving

If you're interested in owning a video monitor that produces reference-quality images, you need to find a set that delivers excellent, accurate performance in a number of key technical areas. Among the most important of these are: high-voltage power regulation, high-frequency response, geometry and convergence, NTSC decoding, DC restoration, and gray-scale tracking and adjustability.

Notice that we're talking about specific parameters here, not something as nebulous as "picture quality." If you find a monitor that does these things well, you have a pretty good chance of getting a TV that's not a lemon.

In order to discern how well a TV handles in the twisty bits, you must take it on a test drive. Before you can do so, however, you must purchase the video equivalent of a test track: Joe Kane's NTSC test laserdisc, *A Video Standard (AVS)*. Your local laserdisc shop probably has a copy in stock; if not, contact Reference Recordings at (800) 336-8866 to order a copy. *AVS* carries a retail price of \$69.98 and is worth every penny!

To evaluate video monitors properly, you should use the same laserdisc player and composite-video interconnect cable you plan to use in your system. Don't use an S-video cable (if you do, you won't be able to tell how good the Y/C separator circuit in the TV is) or—yikes!—a plain old audio patch cord. Now is the time to drop a few bucks on a high-quality composite video cable. Otherwise, you'll be wasting your time.

Dealing with the dealer

If you plan to evaluate a flock of different monitors, call around to your local A/V dealers and ask if they'll let you use your laserdisc player and interconnect cable to evaluate their TVs. If they decline, ask to speak to the manager. Explain that you're buying a new TV, and you need to evaluate several different performance parameters. To do this, you need to attach your laserdisc player to the TV, since it is part of the overall playback system.

Assure the dealer that you don't want to waste their time and that you'll be happy to share the results of your testing

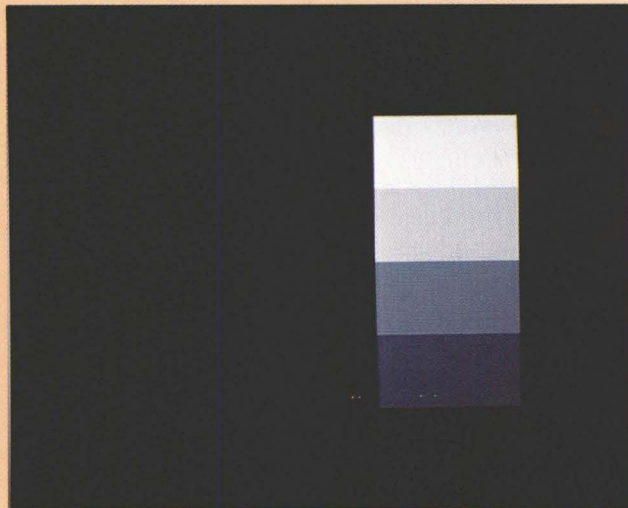


FIG. 2: When brightness is adjusted correctly, the vertical dark-gray bar will disappear into the background and the light-gray bar will be just barely visible.

with them. Most savvy supervisors will realize that you fit the profile of an "expert advisor," the type of person that friends and acquaintances call for advice when they're buying a TV. If you've had positive experiences at a local shop, and they carry the set you eventually select, chances are you will recommend the place to your friends. This means more business for the store. You really shouldn't need to explain this to the manager—the good ones know it. Call around until you find a shop that's willing to work with you.

When you find a cooperative shop, ask about their "slow times." Retail traffic is usually sluggish during weekday mornings and around dinnertime. Plan your visit during a three-hour lull and you'll probably get everything done in one trip. If you try to test TVs when the store is busy, you may have to wait for someone to assist you. And you certainly won't be able to switch monitors quickly.

If you're in a retail store, don't expect constant attention; most salespeople work on commission, and they need to make a living while you're looking at monitors. Commission is a volume business, so unless you're willing to pay the salesperson \$50 or \$100 an hour to follow you around, have a little patience. If things are really slow (i.e., no customers in sight), the salesperson may offer to give you a hand with things. If this happens, share what you're doing, and why you're doing it. Who knows—you may both benefit from the experience.

Before you drag in your test gear, visit the store and take a trial lap. Examine the TV display area. Do you notice any immediate problems? If the store lighting is too bright, it may be next to impossible to run any of these tests. If the ambient light levels are due to sunlight, consider running your tests at night (or better yet, find another store).

Assuming the viewing environment is acceptable and the store will allow you to evaluate TVs, you're ready to schedule your first test drive. It doesn't hurt to call right before you go to the store, just to make sure that (1) the person you talked to is working that day, and (2) the store is open and not in the middle of inventory.

When you arrive, carry your laserdisc player, *AVS* disc, and video patch cord to the front counter and ask for the person you spoke to on the phone. Since you've already confirmed that they are there, there should be no problem. If there is a problem, politely ask to see the manager and, as amicably as

possible, explain your entire saga in excruciating detail. Nothing gets to managers like politeness and detail. If they can't find the salesperson, they may offer to help you themselves.

Start with your first-choice TV. Attach the laserdisc player to the TV's composite video input using your interconnect cable. Pop *AVS* in the player and fire it up. When you get a picture, pull out the remote, put on those driving gloves, and get ready to...

Start your engines!

In "Blues in the Night," the cover story in *SGHT*'s Spring 1996 issue (Vol. 2 No. 1), Thomas J. Norton explained that virtually all consumer televisions are deliberately misadjusted at the factory. In particular, the brightness and contrast controls are usually cranked all the way up to produce an intensely bright picture. This helps the TV "pop" on a crowded sales floor, but it also results in a nonlinear, eye- and CRT-straining image.

The various test patterns on *AVS* can be used to correctly set a TV's user-adjustable controls (contrast, brightness, color, hue, and sharpness). In fact, I offered a step-by-step procedure to do just that in "Please Touch That Dial," which you'll find in the same issue. In this article, we'll use many of the same test patterns and take many of the same steps. This time, however, we'll also use the test patterns to reveal how well—or poorly—the TV handles the specific technical criteria mentioned earlier.

Before you do anything else, you must correctly adjust the TV's brightness (black level) and contrast (white level) controls. Call up chapter 7 on *AVS* and advance to frame 50785. Adjust the TV's brightness control all the way up. Notice the two vertical bars on the left-hand side of the screen; one should be darker than the surrounding background, and the other should be lighter (see **Fig. 1**). Turn the brightness control down until the darker bar disappears into the background, but the lighter bar is still barely visible (see **Fig. 2**).

Next comes the contrast control. If contrast is turned up too high, the electron beam that excites the screen phosphors may lose focus and cause other, adjacent phosphors to glow. Known as "phosphor flare" or "blooming," this problem is exacerbated if the phosphors themselves are of inferior quality or spaced too closely together. If a set has too much phosphor flare,

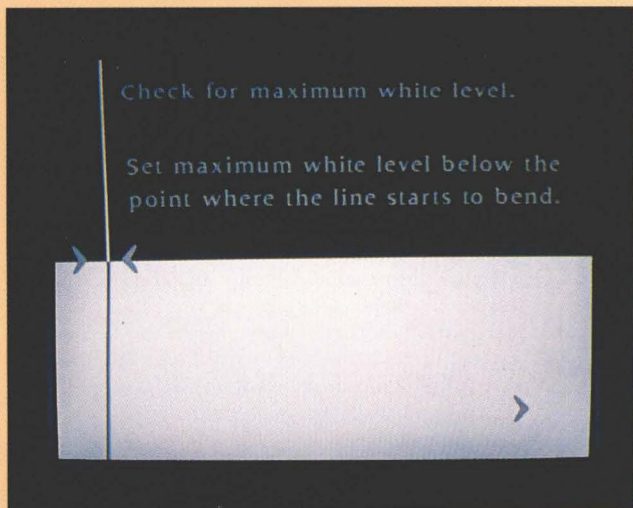


FIG. 3: If the TV has a good high-voltage power supply (and providing that the contrast is correctly adjusted), the needle pulse pattern in frame 50787 will be reproduced as a straight, vertical line.

We're talking about specific
parameters here,
not something as nebulous
as "picture quality."

the overall picture will be "blurry," bright scenes or objects will always be distorted, and you'll never be able to see fine detail.

All sets exhibit some phosphor flare when overdriven. The object here is to adjust the contrast *below* the point at which blooming occurs to eliminate the effect. To test for phosphor flare, crank the contrast control (called "picture" on some sets but more properly known as "white level") all the way up to its highest setting with frame 50785 still on the screen. Carefully examine the four gray boxes on the right side of the frame.

You should see the top (white) box distort and get bigger, or "bloom." It may even take on a yellowish hue. Reduce the contrast level until the yellow hue disappears and the box is exactly the same size as the darker boxes below it. If you're not sure of the right setting, rock the contrast up and down until you zero in on the correct level.

Another method of setting contrast is advocated by Imaging Science Foundation (ISF) President and *AVS* author Joe Kane. Use the horizontal line structure within the white box as an indicator and increase the contrast control as much as possible while keeping the line structure visible. If you go too high, phosphor flare obscures the lines, making the box seem solid. Although this method works, some people find the resulting picture too dark to be practical.

Once you have the contrast set, readjust the brightness as before, until you can just barely see the light gray vertical bar. With the preliminary adjustments out of the way, it's time to separate the peaches from the lemons.

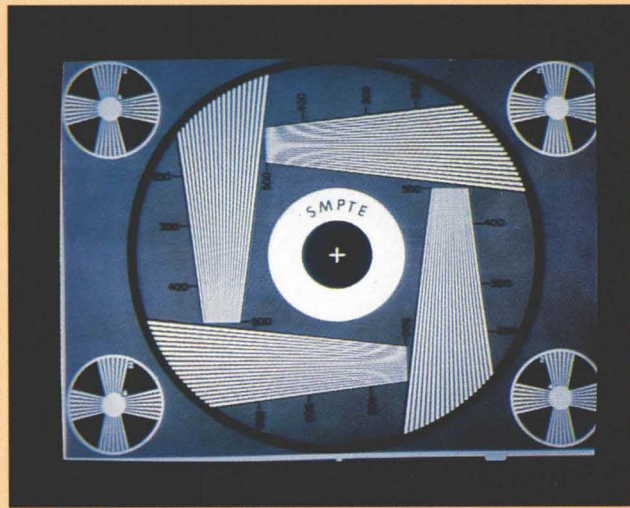


FIG. 4: The two vertically oriented, wedge-shaped patterns in the SMPTE resolution chart (frame 50789) indicate horizontal resolution. The circles also reveal geometry problems—they should all be perfectly round.

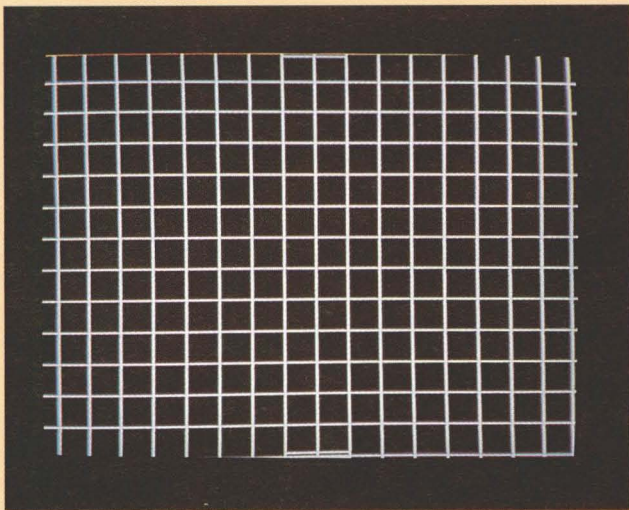


FIG. 5: The convergence pattern (frame 50820) highlights geometry and convergence problems. For example, the TV pictured here has a pronounced tilt.

High-voltage power supply

Except for LCD models, all televisions contain a high-voltage power supply. This circuit generates an extremely high voltage (14,000 to 31,000 volts) at the face plate of the CRT, which draws the electrons streaming out of the neck of the tube to the phosphor-coated front surface. The larger the CRT and the brighter the image, the higher the voltage required.

If the contrast control is too high or the power supply is simply too wimpy, bright scenes may call for more voltage than the circuit can deliver. The result is similar to what happens if the power supply in an audio amplifier is overloaded: distortion.

Although the high-voltage power supply is a critical factor in a TV's ability to produce a good picture, manufacturers often cut corners here to save money. If the set you are considering is on the low-end of the price spectrum, chances are it has a cheesy, poorly regulated power supply. How do you test for it? Easy:

Go to frame 50787 on *AVS* (see **Fig. 3**). If the set has a good power supply, it will reproduce the needle pulse pattern (the thin white and black lines) as a single, straight, vertical line. If it doesn't, the line will appear to be bent at some point. Note that even if the TV *does* have a good power supply, the line may appear curved if the contrast is adjusted too high. Back off on the contrast control and see if the bend goes away. If the bend only disappears when the contrast control is at minimum, which is too dark for viewing in most cases, ditch the TV and move on to the next one on your list. *[Before you*

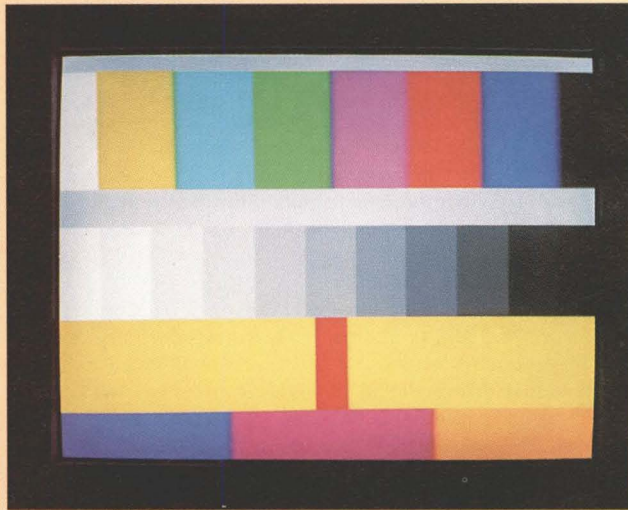


FIG. 6: The three horizontal bars in the lower portion of the combo test pattern (frame 50794) should be distinct colors. If they look roughly the same color, the TV's auto-tint circuit is engaged.

do, you might want to first check to see if the bend is caused by a geometry problem—see “Geometry and Convergence” later in this article—Ed.]

High-frequency response

Like the treble control on an audio preamp, the sharpness control on a TV is really nothing more than a high-frequency booster. Just as the treble control should be set flat for accurate sound, sharpness should be set at minimum for the most accurate picture on most TVs.

Look at the black line in the needle pulse pattern (frame 50787, **Fig. 3**) and crank the TV's sharpness (or “detail”) control all the way up. As you approach the upper limits of the control, you'll begin to see a series of shadows or white edges added to the edge of the black line. If you want the most accurate picture possible, lower the sharpness control until you see only one solid dark line with no shadows. (You may need to turn the control all the way down.) *[The ISF also suggests using frame 17100 to adjust sharpness. Instead of just one vertical black line, this frame has several lines that criss-cross the screen at various angles—Ed.]*

The resulting picture may look a bit “soft” to you at first, but stick with it. After a while, you'll be amazed at how much more “filmlike” the image seems. Even if you decide you prefer the sharpness higher (many people do), adjust it properly before proceeding. Otherwise, you'll get false readings in some of the following tests.

Now go to frame 50789, the SMPTE resolution chart (see **Fig. 4**). Look at the wedge-shaped, vertically oriented resolution patterns. If your video system is doing its job, the individual lines that make up the pattern probably merge into a gray blur at approximately 400 to 430 lines, indicating you are getting that amount of horizontal resolution. Make sure the set's sharpness is at minimum or the shadows described previously will artificially increase the apparent resolution, rendering the reading meaningless.

If the set under evaluation has a comb filter, you may see a shifting moiré pattern in the resolution chart. If the set has a notch filter, its effect often appears as a “blurring” of the lines, as if someone has taken an eraser to a portion of the pattern. Both of these conditions are normal.

If you've made it this far, congratulations! You have prop-

The sharpness control

on a TV is really

nothing more than a

high-frequency booster.

erly calibrated the white (contrast) and black (brightness) levels of the TV as well as its sharpness. For the rest of your tests, make sure these controls stay at their new levels; some sneaky sets revert to factory defaults unless you “save” the new settings.

Geometry and convergence

While you’re still on the SMPTE resolution chart (frame 50789, Fig. 4), examine the shape of the circles, including the large center circle and the four smaller ones. All of them should look perfectly round. If you’re not sure, get out a measuring tape and compare the width to the height. Any deviation means that the TV’s geometry—its ability to properly reproduce shapes—is not perfect.

Now, go to frame 50820 and look at the convergence pattern (see Fig. 5). All the lines should be perfectly horizontal or vertical. If you see any bowing or tilt, the set is not aligned properly. Pay special attention to the corners and outside edges; this is where the most visible problems occur. A small amount of “barrel” or “pin-cushion” distortion (a slight outward bulge in the center and sides of the image) is common for CRTs, and most rear-projection sets (PTVs) exhibit a variety of geometric aberrations.

Little can be done about most geometry problems except in the case of front projectors, which must be set up for a particular display geometry (relationship of projector to screen) and are equipped with numerous geometric adjustment controls. If a set exhibits serious distortions, move on to the next candidate.

On a front or rear projector, the convergence pattern also indicates how well the three CRTs are aligned, or “converged.” If instead of solid white lines you see red, green, or blue lines (or slight color fringes on the edges of otherwise white lines), the set is not converged properly.

Although such misalignment can typically be improved using the set’s built-in convergence pattern and controls, it’s impossible to get perfect geometry and convergence on some video projectors and many PTVs, especially in the corners. PTVs with multi-zone digital convergence are much better in this regard.

On standard models, however, you often end up with three or four boxes with small amounts of red, green, and/or blue overshoot. Any more than that indicates that the set is misaligned. (If you’re looking at a video projector in a dealer’s showroom and the convergence is way off, that certainly doesn’t say much for the dealer’s ability to calibrate the set properly in your home.) *[Because normal handling during delivery and installation usually disturbs factory settings, the ISF recommends you find out if the dealer will improve the convergence under the manufacturers’ warranty after the set is delivered to your home—Ed.]*

Chroma and hue

Next, search for frame 50794, the “combo” test pattern (see Fig. 6). Running across the bottom of the screen are three horizontal bars, which should be rendered as three distinct colors: orange, yellow, and flesh tone. If they are all roughly the same color, however, it means the set includes an auto-tint control. Dig into the owner’s manual (or call the manufacturer) until you find out how to defeat the auto-tint function. If you can’t discover how to defeat it, or if the set just won’t let you defeat it, ditch the TV and go on to the next set. Auto-tint TVs look terrible.

Unfortunately, most TVs have some form of auto-tint or auto-color circuit, so you’ll probably blow through most of the sets in the store before finding one that doesn’t. Before you give up entirely, however, ask the dealer if the circuit(s) can be turned

If a set exhibits serious

distortions, move on

to the next candidate.

off from a “service menu.” Known only to CEOs and Jedi Knights, service menus are also used for gray-scale tracking adjustments, so it’s a good idea to find out if the dealer knows how to access and use them. Don’t be surprised if the salespeople just give you a blank look, though; manufacturers are extremely reluctant to divulge this information, *and with good reason.*

Service menus are *not* for the uninitiated. The parameters are typically displayed onscreen using cryptic codes, and without a chart, there’s no way to know what you are adjusting. Furthermore, many of the parameters can be properly set only in conjunction with factory test instrumentation. Tweak the wrong thing here, and you’ll do permanent damage to the set. Unless you’ve been through ISF training and know exactly what you’re doing, *don’t risk it!*

Adjusting color and hue

Dial up frame 50788 on AVS and dig out the blue-plastic filter that came with the disc. While looking at the TV through the filter, adjust the color control until the outside pairs of large upper and small lower bars match as closely as possible. (The bars you are looking for are labeled “color” on the screen; see Fig. 7.)

Next, adjust the tint or hue control, looking at the two inner pairs of upper and lower bars (the ones labeled “Hue”). As you move the tint control back and forth, you’ll see the upper bars change in intensity relative to the lower (smaller) bars. Adjust the control until all the bars are the same intensity. Some sets have onscreen displays that obscure portions of the color bars. If this is the case, hit the “display” button to

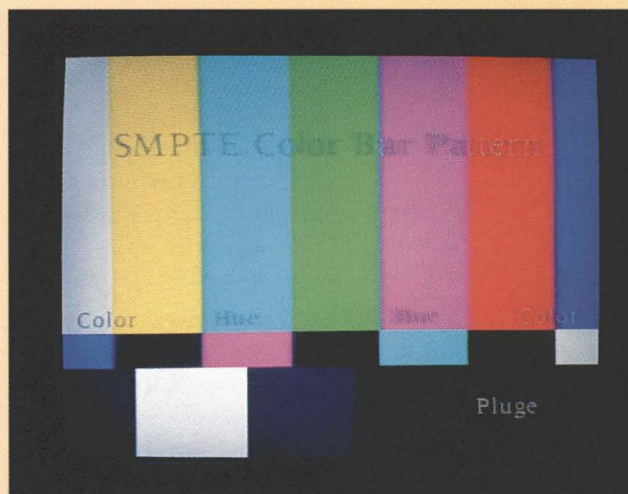


FIG. 7: While looking through the blue filter supplied with AVS, adjust the color and tint (hue) controls so that the appropriately labeled pairs of large and small bars in frame 50788 match in intensity.

DP-870 DOLBY DIGITAL AC-3

DEMODULATOR/DECODER:

- discrete 5.1-channel decoding for Dolby Digital AC-3 soundtracks • DSP decoder with Zoran AC-3 chip • AC-3 RF input for LD • digital AC-3 inputs for future sources with digital AC-3 output (DVD, DSS) • channel level and balance controls
- configuration switches match output to system speakers
- connects directly to the SR-96

- connects to existing A/V systems (separate processor/power amps or A/V receiver with 5 pre-out/main-in loops)

• SR-96 THX AUDIO/VIDEO

RECEIVER:

- premium dual DSP decoder features all-digital Dolby Pro Logic and THX Home Cinema processing • 5 high-current power amps • 110 W x 3 front, 90 W x 2 surrounds (into 8 ohms) • discrete 6-channel input connects to Marantz DP-870 Dolby Digital decoder

- AM/FM tuner with station naming • 5 pre-out/main-in loops
- 4 audio inputs, 5 video inputs with A/V copy features
- composite and S-video switching • advanced multi-room mode provides two independent sources • headphone jack with auto stereo switching • auto power-on sensing on TV input
- on-screen display • banana-jack connections on all 5 speaker terminals

• RC-2000 LEARNING REMOTE:

- total control of your A/V equipment • learns hundreds of IR codes • macro keys store 20 commands each for one-button operation • LCD window and keys illuminate automatically
- ergonomic design with logically grouped functions • LCD displays up to 32 special commands for each component • label naming feature • built-in commands for popular DSS equipment • built-in commands for Marantz and other brands using RC-5 codes

One Great Idea on Top of Another: Introducing the Marantz SR-96 THX Receiver and DP-870 Dolby Digital Decoder



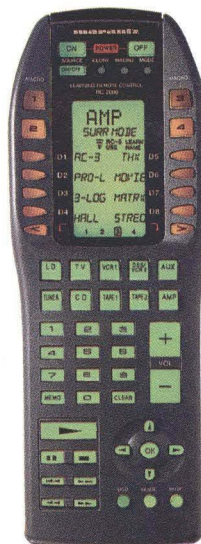
Start with the Marantz SR-96 THX Audio/Video Receiver, a perfect blend of powerful technology and thoughtful design. Premium dual DSPs provide all-digital Dolby Pro Logic decoding and THX Home Cinema processing. Five high-current power amps deliver 110 W continuous to the fronts and 90 W to the surrounds (into 8 ohms). A versatile complement of A/V inputs manages even the largest theater systems. And should you ever actually leave your theater, the SR-96 offers an advanced multi-room mode that can play two sources independently. The SR-96 is the ideal centerpiece for any entertainment system.

Top it off with the Marantz DP-870 Dolby Digital AC-3 Demodulator/Decoder. The DP-870 connects directly to the SR-96 to deliver the most advanced surround sound ever. The DP-870 can even be connected to many existing surround sound systems that use separate surround processor and power amps, and other A/V receivers that feature 5 pre-out/main-in/subwoofer connections. Featuring the high precision Zoran DSP Dolby Digital AC-3 decoder chip, the DP-870 is prepared for the future with additional inputs for other digital AC-3 sources, such as DSS and DVD components.



Now that you have the best in home-theater sound, check out the remarkable Marantz RC-2000 Learning Remote. Designed with input from leading custom A/V installation experts, it's the only remote you'll need for complete and convenient control of your entire entertainment system.

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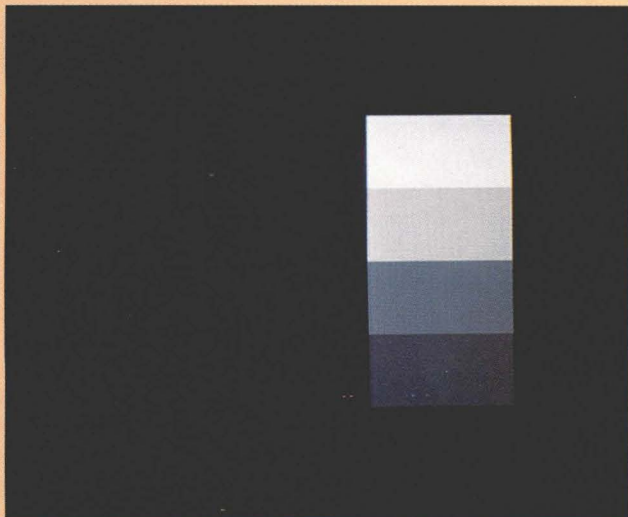


FIG. 8: Call up frame 17168, advance to frame 17169 (Fig. 9), then go back to 17168. The overall brightness should stay roughly the same.

turn off the onscreen readout or wait 15 seconds until the display turns off automatically.

Accurate NTSC decoding

The next test is optional. To perform it, you need to call the Imaging Science Foundation at (407) 997-9073 and ask them to send you a "filter pack." For \$25, you get red and green filters similar to the blue one that came with your copy of *AVS*. (You need these filters only if you are evaluating a direct-view or rear-projection TV. For a CRT-based video projector, simply cover all but the red or green lenses to achieve the same effect.)

Once you have the filters, look through the red one and examine the intensity of the color bars. Repeat the process with the green filter. DO NOT attempt to adjust the color or tint. If you see any variation in intensity of the bars, the set's NTSC decoder is not designed properly. There's nothing you can do about this, except ditch the TV and proceed to another.

If the difference in intensity is small, and you've already trashed most of the sets in the store, you may want to hang on for the last two tests. Remember, all TVs are built with compromises. [*If TJN's and my experience is any indicator, this test may very well eliminate every set in the store. Few consumer direct-view or PTVs have NTSC decoders that are better than fair—Ed.*]

DC restoration

Go to frame 17168 (see Fig. 8). Advance to the next frame (17169, Fig. 9) by pushing the frame-advance button on your LDP remote. Now go back to frame 17168. As you shift back and forth, the overall brightness of the screen may change.

If you see a major difference in brightness between these two frames—you guessed it—ditch the set. The monitor either has lousy DC restoration (the ability to hold video black at black regardless of picture content), or even worse, the manufacturer stuck in a circuit that "clamps" down on anything close to black. As a result, you will never see any detail in shadows and semi-dark portions of the picture, since the set cannot reproduce this information.

Many TVs suffer from this problem, which makes a video image look "punchy" and contrasty; everything winds up looking like Technicolor cartoons. A set with great DC restoration presents a picture that looks more like film.

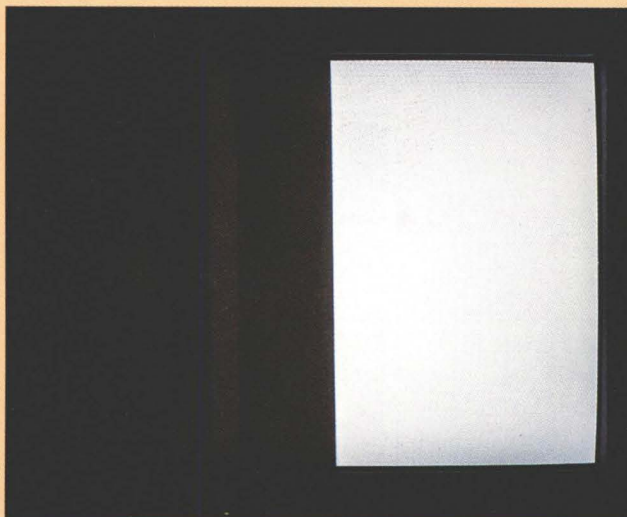


FIG. 9: If you see a big difference in brightness between frame 17169 (shown here) and 17168 (Fig. 8), the TV won't be able to properly reproduce shadow detail.

My torture test for DC restoration and shadow detail is chapter 3 of *AVS*. As the 'copter flies through the canyons, look at the side walls. If your set has good resolution and DC restoration, you should be able to see quite a bit of shadow detail. If not, the shadowed areas of the image will simply look dark and blurry.

The Winner's Circle

You're closing in on the checkered flag now, but to reach the finish line, you must accept some compromises. Virtually no consumer TV will pass all the tests with flying colors, especially those in the more reasonable price brackets. So which compromises are the most tolerable? Opinions vary, but in my judgment [*as well as mine and TJN's—Ed.*] serious geometry or convergence problems are worst, followed by DC restoration problems and poor shadow detail, followed by color problems.

The last lap requires a phone call to the ISF to find out if the TV you are considering can have its gray scale properly calibrated. Although there's no guarantee that the set you have selected is capable of proper gray-scale tracking, if it passed the tests outlined in this article (or at least didn't fail miserably), it's probably a good candidate for a full ISF calibration.

So, now you are the proud owner of a great TV. It does everything well. The picture is spectacular. You can't believe how fantastic movies look with lots of detail, an almost 3-D sense of depth, and rich, vivid colors.

Then it happens. Friends come over to watch a movie and gasp, "Whoa! Where did you find a TV with such an incredible picture?!" You sit back, smile, and say, "Well, it all started when I read this article in *Stereophile Guide to Home Theater*..." **SGHT**

Russ Herschelmann is one of the co-developers of aspect ratio conversion, and is the editor of the CEDIA Home Theatre Manual. He is president of R Herschelmann Designs, an international firm specializing in the design, installation, and calibration of high-end theater and music systems. His design work has been featured in The Wall Street Journal, The New York Times, Architectural Digest, Audio Video Interiors, and many other publications. His office can be reached by calling (707) 252-4434.



The McIntosh of Home Theater.

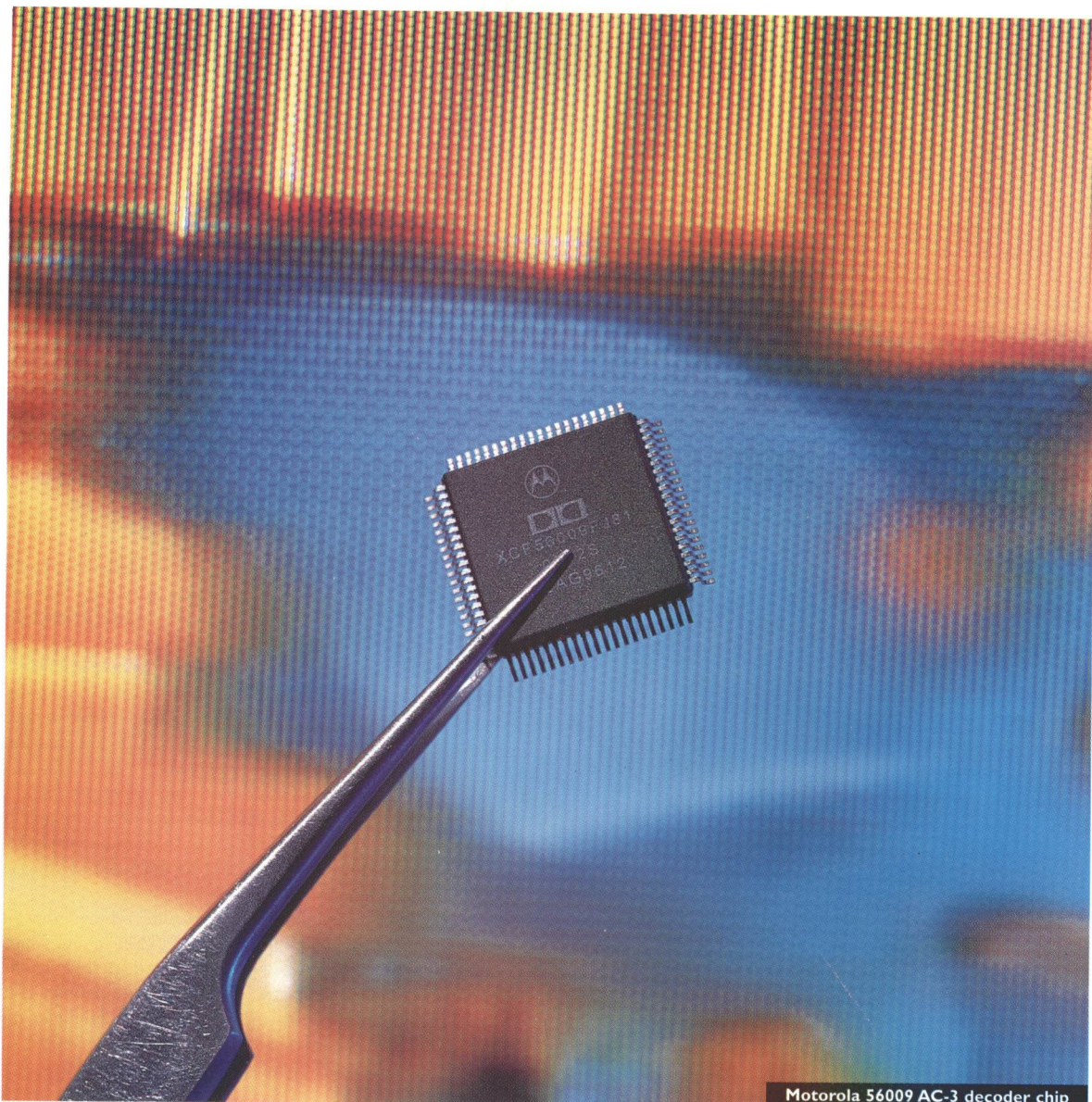
There are two distinct considerations when specifying a Home Theater system: sound quality and theatrical effects. The foreign-built brands try to cram in as many features as possible, while the American high-end community makes only token accommodations to the serious viewers' needs.

McIntosh brings a whole new level of

performance and quality to the audio/video category. A "no-compromise" philosophy that combines a 50-year heritage for producing the finest sound with functionality, spatial circuit design and build quality that is second to none.

So, there are still two considerations when choosing a Home Theater: McIntosh and all the others.





Motorola 56009 AC-3 decoder chip

The Chips are Down

Robert Harley

After a long wait, Motorola's new AC-3 decoder chip is finally here. Can a flood of new processors be far behind?

Although Dolby's AC-3 discrete-digital surround-sound format was officially launched at the January 1995 Winter Consumer Electronics Show, the world is still waiting for AC-3 decoders to become widely available. The delay between the launch of the AC-3 format and the continued lack of AC-3 decoders is scandalous. When will we get AC-3?

This question hinges largely on the availability of Motorola's new AC-3 decoder chip, the DSP56009. Many manufacturers of home-theater products have designed surround processors around this chip, and they are waiting for supplies before they can begin shipping products.

As we go to press, the wait may finally be over. According to Terry Shultz, Program Manager for Multichannel Audio Development at Motorola, the 56009 is past the development

stage and is ready for full production. Five of Motorola's chip factories are certified to produce the 56009 (as well as other members of the 56K family), a factor Shultz cites in claiming that Motorola can supply production quantities of 56009s starting in June 1996. Moreover, Shultz says Motorola has enough pre-production 56009s in stock right now to supply several manufacturers with runs of 400–500 units each.

Given that the 56009 was announced in the fall of 1995, why are the chips only reaching manufacturers now? According to Shultz, what seems like a

protracted delay to home-theater owners is actually the normal time frame for the introduction and development of new silicon. Motorola typically starts the process by seeding "strategic partners" with Alpha- and Beta-test pre-production silicon and documentation. Feedback from these test sites is then incorporated into the final product. Although it results in a better, more useful final product, this process takes time. *[Just ask anyone who has waited...and waited...and waited for a new software program or operating system to be released for their PC—Ed.]*

In the case of the 56009, the first prototype chips, known as "Rev. A," were shipped to a select group of manufacturers around the first week of December 1995. Several companies quickly developed processors based on the new chip. In fact, B&K demonstrated a prototype processor running AC-3 on a Motorola chip as early as January 1996 at the Winter CES. At that point, however, all the control functions had to be executed on an IBM PC.

It turns out that the first Rev. A chips were designed to decode a bitstream from a DVD player, not as full-fledged AC-3 decoding engines for audio/video surround processors. Thus, functions not necessary for a DVD player were not incorporated into these chips (for example, the user interface for the chip's audio decoder—the "microcontroller"—and the on-chip delays for the rear and center channels).

After several rounds of tweaking, Motorola was able to improve the performance of the Rev. A. chip, reducing the number of MIPS (millions of instructions per second, a measure of processor speed) and the amount of memory necessary to run the AC-3 decoding software, or "algorithm" (see sidebar). This allowed the microcontroller, AC-3 decoder, Pro Logic decoder, and MPEG decoder (for use on computer soundcards and in European markets) to be incorporated into

a single chip. Of course, the new version, called "Rev. B," also has enough memory to incorporate the surround- and center-channel delays.

The Rev. B chip was submitted to Dolby for certification in late February. Several weeks of technical wrangling that would make for a good—if incomprehensible—novel followed. Finally, on March 30 at the IAMM (International Alliance for Multichannel Music) workshop, Roger Dressler, Technical Director at Dolby Laboratories, announced that the 56009 had passed certification.

Dolby's announcement put to rest a storm of speculation and rumor. Prior to the announcement, some industry insiders were expressing doubt that the 56009 would be ready before the end of 1996. Talk of problems ranging from unfinished software to hardware glitches sizzled across the Internet. A pernicious rumor whispered that the 56009 had failed Dolby Certification because it lacked enough onboard memory to implement AC-3's rear-channel delay—likely a half-truth dating back to the early Rev. A chips.

Chips ahoy!

So when will we see new processors and upgrades incorporating the 56009? Very soon, according to Shultz. Although the audio/video market is relatively small, the 56009 is also intended for DVD players, set-top boxes, satellite decoders, video games, and even computer soundcards. These high-volume, mass-market applications should help boost the 56009's profile at the electronics giant, so the ramp-up to full production may happen more rapidly than otherwise predicted.

Dressler suggested that if there are no production snags, products incorporating the new chip should be available in late fall of 1996. Manufacturers we spoke to seconded this assertion, saying that Motorola is promising to ship chips in the second quarter of this year.

Theta Digital engineer Jim White reports that Theta received engineering samples of the 56009 in late March for their Casablanca processor, with production quantities promised for May delivery. The 56009's availability is less of an issue with the Casablanca's expandable architecture; the AC-3 decoder board (\$850) containing the 56009 simply plugs into one of Casablanca's four expansion slots.

Chip options

Mike Moffat of MML and designer of the superb Angstrom products started his design effort with the Motorola chip, but switched to the competing Zoran part—available for well over a year—because of the questionable delivery date of the 56009. MML has been shipping AC-3 compatible decoders since mid-1995. Had he designed for the 56009, Moffat stated, MML wouldn't be in business today. The ability to ship product immediately was a crucial factor in his decision to use the Zoran chip. Moreover, Zoran is working on a smaller, lower-cost version of their AC-3 decoder.

Marantz also chose the Zoran chip for their new DP-870 AC-3 decoder for similar reasons. The \$699 DP-870 adds AC-3 decoding to any A/V receiver with preamp-out/main-in jacks, or any separate multichannel preamplifier/power amplifier combination.

The other method of making an AC-3-compatible processor is for the manufacturer to write their own decoding algorithm that runs on general purpose Digital Signal Processing (DSP) chips. Meridian Audio has taken this approach in the acclaimed 565 processor. *[See TJN's review in this issue—Ed.]*



Rotel Report

5



Rotel's RSP-980 provides Dolby® Pro Logic® and THX® certified surround-sound decoding, video switching, and audiophile quality preamp functions for two independent zones.

SYSTEM BUILDING

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In the Rotel tradition, the RSP-980 is built around a multi-segment power supply that provides ripple-free operating voltages thanks to high capacity rectifier and regulator ICs. Careful circuit board layout assures that filter capacitor banks are located near associated active circuitry. Analog stages benefit from precision metal film resistors, low ESR capacitors, and high current operational amplifiers.

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*"The Rotel RMB-100s deserve serious consideration."
Dayna B., The Audio Adventure,
Vol. 2, Issue 2, Dec. 1995*

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Chipping Away

The Motorola DSP56009 is a digital signal-processing (DSP) chip customized for AC-3 or other forms of movie soundtrack decoding. A DSP chip performs mathematical processing on digital data according to instructions contained in the "firmware." Just as your personal computer's software tells the hardware what to do, firmware is a set of instructions that tells the DSP chip what processing to perform on the digital-audio data. This set of instructions is called an *algorithm*.

The AC-3 version of the 56009 runs an algorithm that tells the chip how to decode the AC-3 datastream from a laserdisc, DVD, or other medium. The chip "decompresses" the AC-3-encoded signal to produce six discrete digital-audio outputs that are then converted to analog by the preamplifier/processor's digital-to-analog converters.

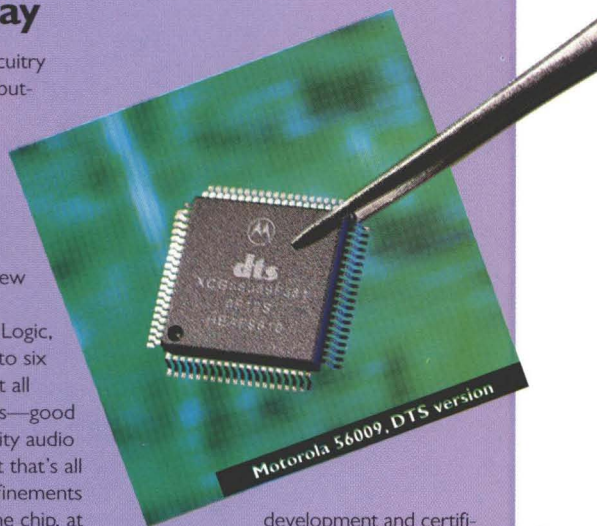
In fact, the 56009 is simply a specialized version of Motorola's general-purpose DSP56004 chip with additional ROM containing the AC-3 decoding algorithm. (The 56004 is commonly used in processors that perform Dolby Pro Logic decoding in the digital domain.) Unlike the 56004, which relies on external RAM chips to store its algorithm, the 56009's AC-3 algorithm is permanent; manufacturers can't customize or update it.

The interface between the manufacturer's hardware and the audio decoder inside the 56009 is a firmware routine called the *microcontroller*. When you push a button on a product's remote to, say, switch from Pro Logic mode to

Dolby Digital, the product's circuitry simply pokes the appropriate "button" on the microcontroller, which then calls up the appropriate algorithm. This is just one example of how a sophisticated DSP chip such as the 56009 makes it easier for a manufacturer to implement a new product.

In addition to AC-3 and Pro Logic, the 56009 will also support up to six channels of linear PCM audio at all sample frequencies and bit rates—good news if and when a higher-quality audio standard emerges for DVD. But that's all she wrote. Although further refinements are constantly being made to the chip, at this juncture, the current version of the 56009 is "maxed out." There's no more room in the chip for additional signal-processing options, such as THX 5.1, sophisticated bass-management schemes, or surround-channel soundfield processing. However, according to Shultz, these functions can be easily implemented using a second Motorola 56004 processor. (The bass-management scheme built into the current 56009 is evidently a minimum "base-case" scenario. *Sigh...*)

Another algorithm left out in the cold is Digital Theater Systems' excellent-sounding Coherent Acoustics decoder. But DTS fans (or should I say fanatics?) needn't despair. A version of the 56009 incorporating the DTS algorithm is slightly behind the AC-3 version in the



development and certification process, but Motorola claims it should be available in quantity by August. In addition, Shultz indicated that—if a manufacturer uses a second DSP chip to implement THX 5.1 as described in the preceding paragraph—there should be enough horsepower left over to run DTS. Perhaps there's hope after all!

As promising as the 56009 looks, we ain't seen nothin' yet. Motorola's next generation of AC-3 decoders will have more than twice the computing horsepower of the 56009. Code named Onyx, the new chip will be able to perform AC-3 decoding, THX processing, and other digital soundfield manipulation, all on one chip. However, don't look for home-theater products based on the Onyx to be available until at least 1998. —RH

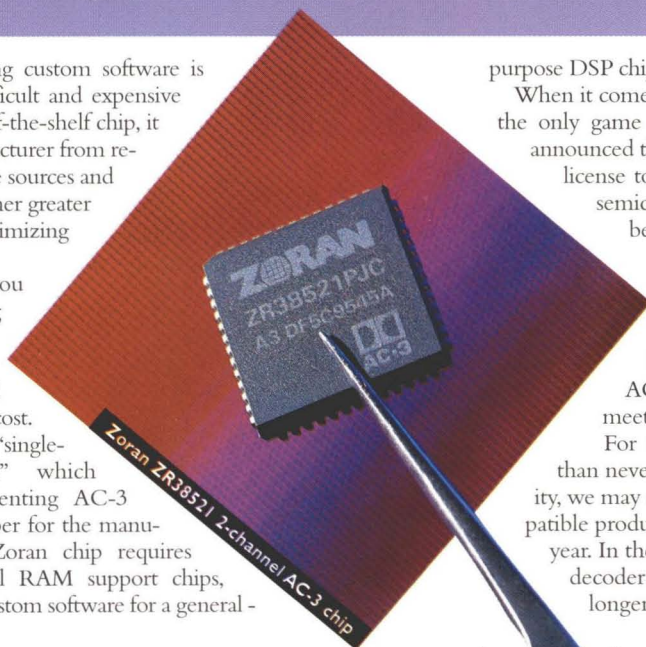
Although writing custom software is much more difficult and expensive than using an off-the-shelf chip, it frees the manufacturer from reliance on outside sources and allows the designer greater flexibility in optimizing the product.

By now you may be asking yourself, "Why use the 56009 at all?" It all comes down to cost. The 56009 is a "single-chip solution," which makes implementing AC-3 easier and cheaper for the manufacturer. The Zoran chip requires costly additional RAM support chips, while writing custom software for a general-

purpose DSP chip is simply not an option for most companies. When it comes to a single-chip AC-3 solution, Motorola is the only game in town—for now. Dolby Laboratories has announced that 44 IC manufacturers have applied for the license to make AC-3 decoding chips, but given the semiconductor industry's lead time, it may be years before we see products using these new chips.

For now, most manufacturers are dependent on the 56009. Many have already invested considerable development time and money on 56009-based designs, and have announced availability dates for their AC-3-compatible products—dates they may not meet, even if they receive quantities of chips today. For the home-theater enthusiast, late is better than never. With the 56009 finally a commercial reality, we may at last see some of the dozens of AC-3-compatible products that were scheduled for introduction this year. In the meantime, your good old Dolby Pro Logic decoder may need to hang in there a little while longer.

SGHT



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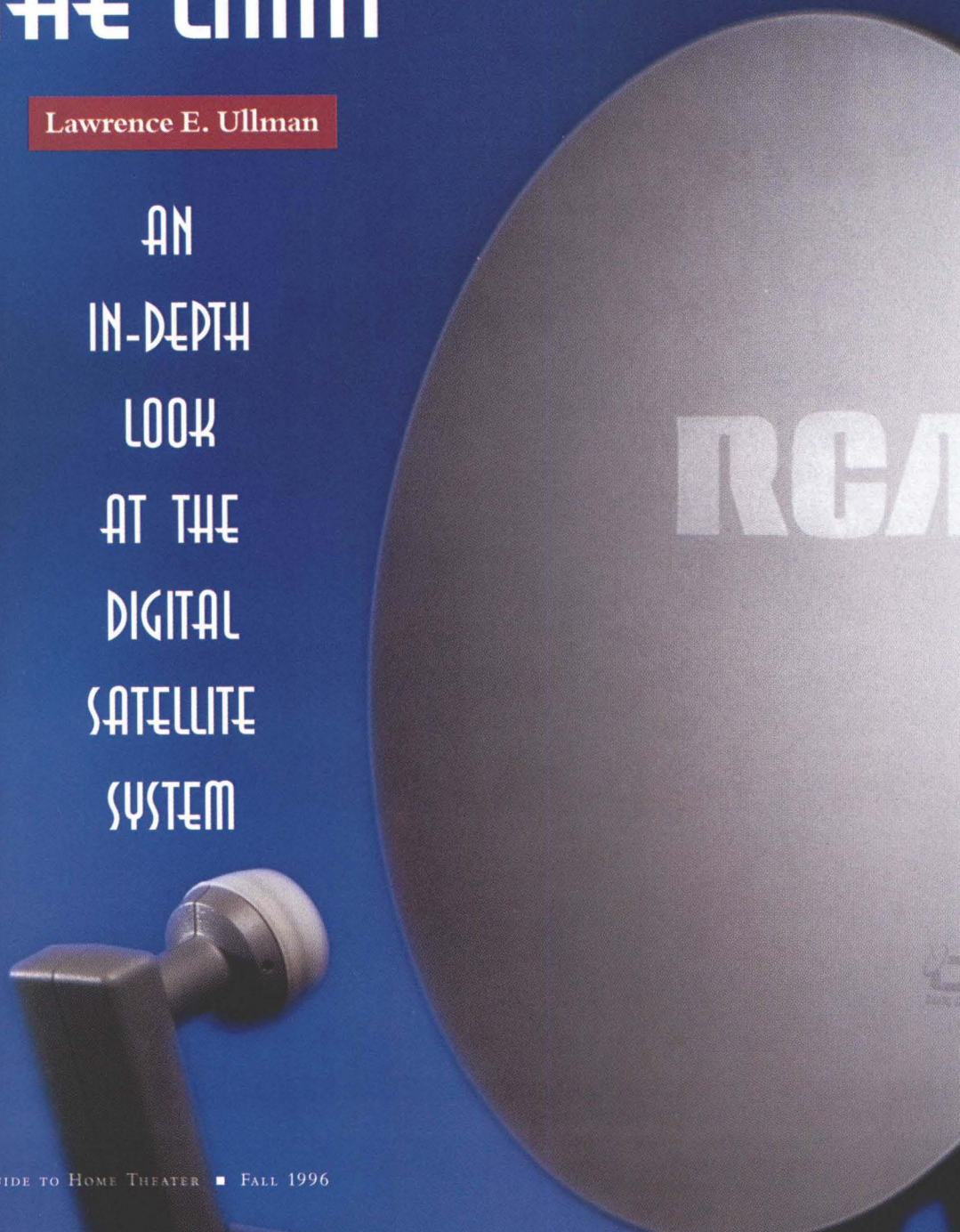
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DSS: THE SKY'S THE LIMIT

Lawrence E. Ullman

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LOOK
AT THE
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IT'S THE FASTEST-GROWING consumer-electronics product in history. Over one million units were sold in 1995, and 1996 sales are expected to be even greater. Conservative estimates expect it to reach more than 10 million homes by the year 2000.

Of course, I'm talking about the Digital Satellite System (DSS®). In case you've been hiding out in a shack in Montana, DSS is the all-digital, small-dish, satellite-based audio/video delivery system promulgated by Thomson Consumer Electronics (RCA) and Hughes Electronics.

Yet despite its overwhelming popularity with the general public, DSS remains controversial among videophiles. Some reject the system out of hand, insisting that it's fraught with image-distorting digital artifacts and doesn't deliver "laserdisc-quality picture" and "CD-quality sound" as claimed. Others dismiss artifacts as a minor irritant and consider DSS the most exciting, important, and downright useful audio/video delivery medium since the VCR.

Given such highly polarized opinions, I decided it was time for *SGHT* to take a fresh look at DSS. Many changes have transpired since we published Daniel Kumin's general introduction to the system in the Fall 1995 issue (Vol. 1 No. 2). For example, two new manufacturers (Sony and Hughes Network Systems) have joined Thomson Consumer Electronics (RCA) in the DSS hardware market. In addition, Thomson has introduced a second-generation receiver, a third DSS satellite has come online, and the digital-video compression scheme that makes the entire system practical has been significantly upgraded.

When I set out to produce this article, my goal was to answer a number of specific questions. As a card-carrying videophile, the top items on my list related to picture quality. Are digital artifacts a mountain or a molehill? How does DSS's overall picture quality stack up to tape, laserdisc, and other broadcast sources? How consistent is the picture, channel to channel? Are there any performance advantages between competing DSS hardware packages, or are the differences merely cosmetic?

DSS is a deep subject. The more I delved into it, the more directions it led me in. As a result, I decided to organize certain material into sidebars. Two of these—"Star Warriors: RCA vs. Sony," and "TV On Tap: DSS Programming Options" (which outlines the myriad DSS programming options)—were contributed by Dennis Barker. In addition, you'll find a detailed look at the DSS signal path in a separate feature in this issue, "Bent Pipes in Space." It's essential reading for those who want to know more about how DSS works, and why it looks and sounds the way it does.

3, 2, 1... Liftoff!

The only way to really understand a complex technology such as DSS is to live with it over an extended period of time,

so I arranged to have RCA's second-generation DS4430RA package (\$799) installed in my Santa Fe home. Although I can swing a hammer with the best of 'em, I was perfectly happy to leave the installation in the capable hands of DirecTV New of Mexico.

The two-man installation crew mounted the dish on the roof next to my broadcast TV antenna and routed the coax cable down the side of the house, under the crawl space, and up through the floor to reach the receiver. They even installed a new phone jack behind my equipment rack.

(The need for a phone connection is explained in the "TV On Tap" sidebar.)

I evaluated the DSS receiver's video performance using a properly calibrated 55-inch Toshiba TP55E80 rear-projection TV (review in progress). Three surround processors came and went during the review period, including a Marantz AV600, Chiro C-800, and Denon AVP-8000. The processors fed Chiro C-300 and C-200 amps, which in turn drove a B&W speaker system consisting of Matrix 801 Anniversary Edition main speakers, HTM center channel, SCM-8 THX dipole surrounds, and an 800ASW subwoofer.

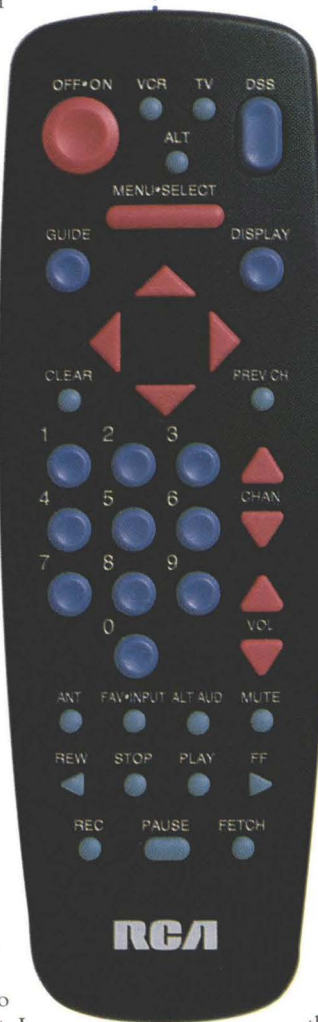
Other source components included Denon LA-3500 and Pioneer CLD-D704 laserdisc players, and a Marantz MV610 Hi-Fi VCR. Approximately halfway through the review period, I recabled my entire system, replacing the usual Monster M-series audio and video cables with various models from MIT.

Warts and all

Pressing the Guide button and scrolling through the humongous onscreen Program Guide for the first time is an exhilarating experience. I must admit it made me chuckle like a mad scientist whose experiment had just come to life. According to my wife, the expression on my face was familiar—our two-year-old daughter looks exactly the same when she walks into Toys R Us.

Far from breeding contempt, several months of familiarity with DSS have produced nothing but admiration. At its best, the system delivers picture and sound that are light-years beyond videotape, cable, or broadcast. (We'll get to laserdisc later.) Compared to these sources, the DSS picture is sharp and noise free, colors are more realistic and better saturated, and there are no moving hum bars or ghosts. And despite the limitations of the digital-to-analog converters in the RCA box (there's no digital output), the overall sound quality is dramatically better than the other sources. (More on this shortly.)

Of course, the system is not without a few warts. Although the variance is nowhere near that of cable, DSS's picture and sound quality do deviate from channel to channel and even from program to program on the same chan-



nel. But this is to be expected. The DirecTV uplink center in Castle Rock, Colorado and the USSB uplink center in Minnesota receive program material in just about every format known to man. As always, the "garbage in, garbage out" rule applies. In addition, different channels are compressed at different rates, which greatly affects final quality. (See "Bent Pipes in Space" following this article for details.)

When you watch a pre-recorded show on DSS—say, a pay-per-view (PPV) movie—you are actually seeing a "house master" tape. According to DirecTV, house masters are the end product of a "Quality Assurance/Formatting" (QA/F) process. Two knowledgeable sources told me that, among other things, the house master tapes are optimized for digital compression by filtering out video noise and slightly rolling off the high-frequency video information.

Live broadcasts are a different story. In fact, live sports broadcasts may be DSS's worst-case scenario. First, the broadcast is received from a C-band satellite downlink just like those used by cable companies and broadcast affiliates. The signal is then immediately digitized, encrypted, compressed, and uplinked to the DSS satellites for delivery to the dish on your home. No time for a QA/F step here! In addition, sporting events typically contain lots of fast motion against a complex background—a nightmare combination for the MPEG-2 data-compression scheme on which DSS is based. (More on this later).

Although I'm not a big sports fan, my wife and I do enjoy watching figure-skating, which just happens to provide a great DSS torture test. The live broadcast of the World Championships was filled with fast motion and intense col-

Star Warriors: RCA vs. Sony

Dennis Barker

DSS was developed by Hughes Communications (which launched and operates the satellites and provides the DirecTV programming service) and Thomson Consumer Electronics. So it should come as no surprise that the first DSS hardware was brought to market by Thomson through its RCA, ProScan, and GE brands.

As a co-developer, Thomson had exclusive rights to sell DSS hardware for a period of one year or until one million units were sold, whichever came first. Units flew off dealers' shelves, so the latter condition was quickly satisfied. Sony had been waiting in the wings and quickly entered the market with several models. Although as many as eight other companies are expected to introduce DSS hardware during 1996, only Thomson, Sony, and Hughes Network Systems are shipping products as of this writing.

Except for superficial cosmetic differences, the RCA and Sony DSS hardware is extremely similar. As a result, we wondered if any perceptible performance advantages might justify the purchase of one brand over another. To find out, editor Lawrence Ullman asked me to compare the same RCA DS4430RA package (\$799) he auditioned with Sony's current top-of-the-line model, the SAT-AD1 (\$950).

There's no sense in beating around the bush: In terms of picture and audio quality, the two units are indistinguishable. You can buy either one and expect equivalent audio/video performance. However, there are big differences between their operating systems and user interfaces.

Both systems have colorful onscreen displays that include a TV Guide-style programming grid. Like the graphic interface on a personal computer, you execute sys-

tem functions by selecting items from menus. Instead of a mouse, the device used to "point and click" is a remote control.

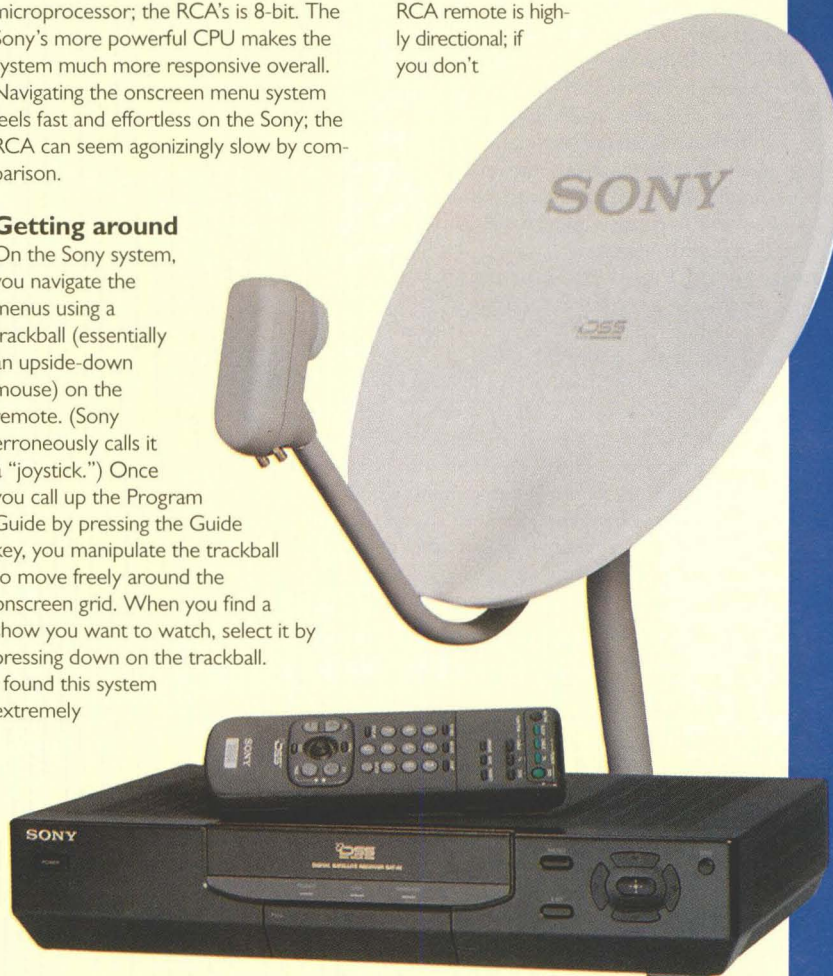
The Sony system is based on a 32-bit microprocessor; the RCA's is 8-bit. The Sony's more powerful CPU makes the system much more responsive overall. Navigating the onscreen menu system feels fast and effortless on the Sony; the RCA can seem agonizingly slow by comparison.

Getting around

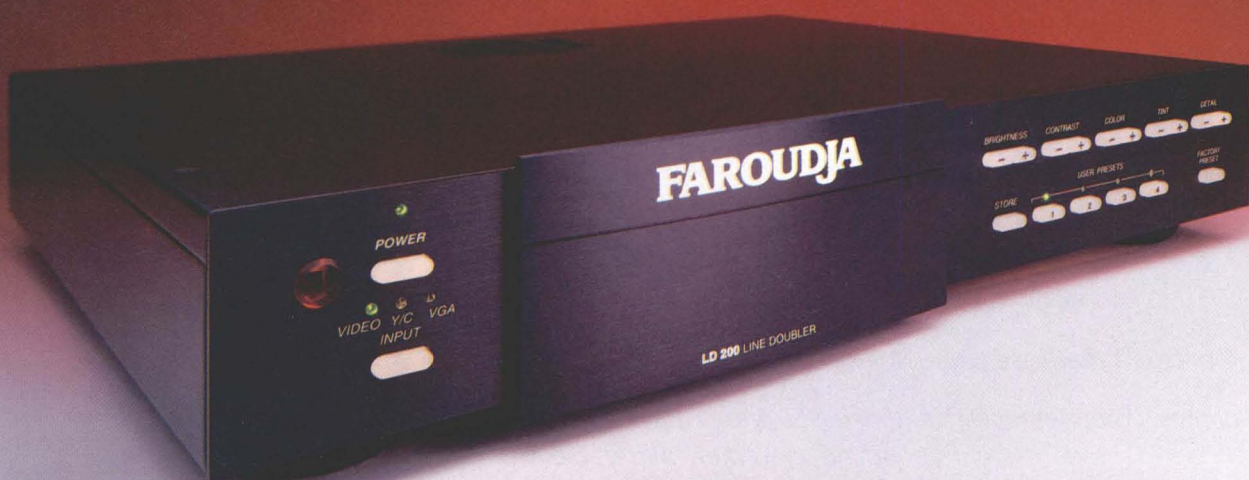
On the Sony system, you navigate the menus using a trackball (essentially an upside-down mouse) on the remote. (Sony erroneously calls it a "joystick.") Once you call up the Program Guide by pressing the Guide key, you manipulate the trackball to move freely around the onscreen grid. When you find a show you want to watch, select it by pressing down on the trackball. I found this system extremely

easy and intuitive to use. It brings one-thumb navigational access to DSS.

The RCA system uses a traditional 4-way cluster of cursor keys to move around the menus. Once you've highlighted a menu item, you press a large Menu/Select bar to select the item. The RCA remote is highly directional; if you don't



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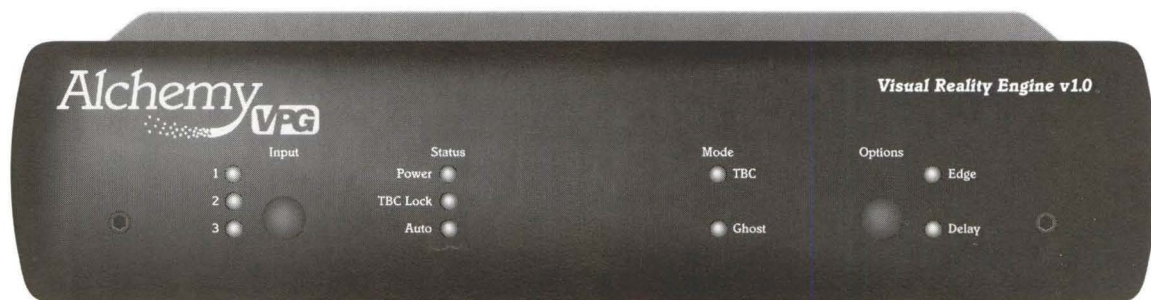
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ors on a brightly lit white surface, all set against the complex, shifting background of the audience. Overall, the picture was about as grainy and "digital looking" as I've seen from DSS. The image broke up into obvious pixels—the notorious "motion artifacts"—only once, but rapidly rotating sequined costumes are an MPEG nightmare! Nevertheless, other than those few milliseconds, the event still looked better on DSS than via our rooftop antenna (which provides better-than-average broadcast reception on some channels and average reception on others).

However, the most glaring example of variable channel quality I've seen so far was the ABC live broadcast of the 68th Academy Awards. DSS now carries two ABC feeds: KOMO out of Seattle and WJLA from Washington, DC (You receive these channels only if you subscribe to the PrimeTime 24 network package; see the "TV On Tap" sidebar).

point it directly at the DSS receiver; your commands don't get through. In addition, it sometimes takes repeated button pushes before the system responds.

Other operating-system differences are more subtle, and they are not all in the Sony's favor. For example, you must push Enter after entering a three-digit channel number on the Sony remote; the RCA changes channels automatically after you enter the third digit.

After the selected channel comes up on the Sony, its icon and number are momentarily displayed in the upper right-hand corner. On the RCA, however, you get a much more comprehensive transparent display superimposed over the top section of the picture. In addition to channel, time, and date, this display provides rating information (if available), start and end times for the current program, parental-lock status, etc. If you press the Display key again, you get a synopsis of the current program.

On the other hand, the RCA's Program Guide completely takes over the screen; you lose the audio and video of the program you were watching. The Sony's onscreen display retains the audio and a portion of the picture from the current channel, which is a nice touch.

The Sony's Program Guide offers a handy jump-forward feature that lets you skip several hours or days ahead by simply pressing the Guide button more than once. With RCA's Guide, you must continuously tap the right cursor key to move the timeline forward.

However, the Sony unit lacks one extremely useful feature found on the RCA: One-Button Recording. To tape a program using the Sony SAT-AD1, you must first program the receiver's built-in timer to turn the unit on and off at specif-

ic times, then program your VCR with its normal timer-recording procedure. On the RCA, you simply highlight a program in the Guide and press the Record button on the remote. The RCA receiver then automatically controls your VCR using a tiny IR emitter, or "blaster," that attaches to the VCR's front panel. This is about as easy as it gets. With either system, you must always remember to set the VCR to its external A/V input and power it down before recording begins.

Conclusion

Sony's SAT-AD1 and RCA's DS4430RA offer equivalent audio/video performance. The RCA's onscreen graphics are more attractive and useful, but the Sony's 32-bit microprocessor is much more responsive than RCA's rudimentary 8-bit system. While RCA's ergonomically designed remote is pleasing, I like Sony's trackball better than RCA's directional cursor keys. However, if you are going to be taping a lot of DSS shows, RCA's One-Button Recording feature is a big plus. In the final analysis, you can't go wrong with either system.

As we went to press, Sony's second-generation DSS products are scheduled to be available in the Fall 1996 time frame. According to Sony, their new SAT-AD2 system will

Normally, the two ABCs run the same programs, but they are three hours out of sync. However, the Academy Awards were simultaneously broadcast live on both channels, which provided an excellent opportunity to A/B the same program on different channels.

WJLA's feed looked and sounded great. The video was essentially noise free, and details such as the texture on tuxedos were easily resolved. The color was also excellent; subtle shades and lighting details (e.g., the slowly rippling cloth backdrop behind the presenters) were clearly rendered.

The audio from this year's show was broadcast using the Spatializer 3-D soundfield enhancement system. With my surround processor set to stereo bypass mode, WJLA's sound was crisp and dynamic and exhibited a good soundstage. Although Spatializer is a non-Dolby system, switching the processor to Pro Logic mode nevertheless anchored the dialog

ultimately replace the AD1 and include all the features of the previous model, in addition to enhanced, 16-color, view-through display graphics with changeable background colors. The AD2 will also feature a one-button record function. Of course, you can expect RCA to respond with new units of its own before too long.

—DB



in the center-channel speaker and routed audience sounds (applause) to the surrounds.

Flipping to KOMO was a shock. The video was noticeably noisier and grainier, and the audio was drastically lower in level and collapsed to mono. This was one of the few instances in which my broadcast antenna actually produced a better picture than DSS. Why did the two channels vary so much? The most likely explanation is that KOMO's signal was of poor quality from the get go; DSS just relayed what it received.

DSS vs. Laserdisc

By far the best-looking and best-sounding channels on DSS are the Direct Ticket pay-per-view (PPV) movie channels. Not to be confused with the "Premium" movie channels, such as HBO and Showtime (I've found their audio/video quality to be mediocre, at best), the Direct Ticket PPV channels are supposedly sourced directly from D1 digital master tapes, the same format from which laserdiscs are mastered. However, you pay \$2.99 a pop for the privilege of watching a movie on these channels, so they'd *better* be of the highest quality! If anything on DSS is going to live up to the format's claims of "laserdisc-quality picture" and "CD-quality sound," the PPV channels should be it.

There's only one way to know for sure: Perform an A/B comparison between the same movie on PPV and laserdisc. However, this turned out to be easier said than done. Most of the movies on PPV are pan-and-scan versions; only a handful of titles are offered in letterbox each month. On the other hand, most high-quality laserdisc transfers are available only in letterbox format. Fortunately, *Apollo 13* began a run on PPV in its original 2.35:1 format, and I had the letterbox laserdisc of the movie on hand, so I was in business.

Synchronizing the two sources turned out to be tricky. I would have to start the laserdisc exactly in sync with the PPV broadcast, and I would only get one shot at it. I purchased a 7:30 PM showing on channel 120 (LTBX). While waiting for the broadcast to start, I cued the laserdisc to the point in the opening credits where the words "A film by Ron Howard" just disappeared from view and left the player in pause mode. Then I switched the input selector to DSS and waited, sweat trickling down my brow, while DSS displayed a countdown to movie start accompanied by music and still images from the film.

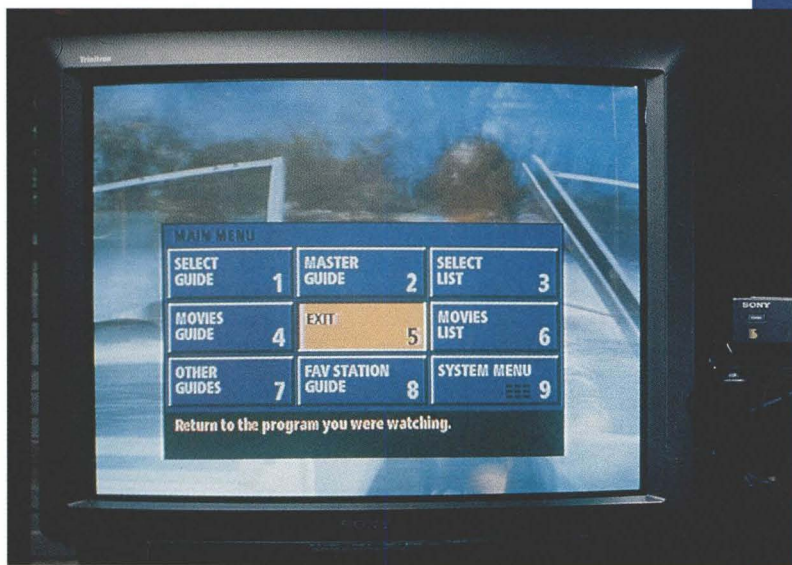


RCA's "living room" main menu is whimsical and easy to use. The timer clock sets itself, and can be displayed in digital or analog styles. The sky outside the window even changes to reflect the time of day!

The instant the "Ron Howard" credit faded from view on the DSS picture, I punched the Play button on the LD remote. Success! I managed to get the two sources synchronized within a frame or two. For the next 50 minutes or so (until the disc changed sides and fell out of sync with DSS), I flipped back and forth between the two formats, comparing both the S-video and composite outputs of both sources by switching inputs on the TV. (The processor's composite and S-video monitor outputs were both connected to the TV, while the S-video and composite outputs from the DSS receiver and LDP were connected to the processor using identical MIT Video-LinQ and S-LinQ interconnects.)

Looking at the composite outputs, both images looked extremely good; there was little obvious difference between them. After a few minutes, though, I began to notice that the laserdisc picture seemed slightly greenish compared to DSS. The PPV broadcast also seemed slightly more "contrasty" than the LD. These were subtle differences; had I wanted to, I probably could have tweaked the TV (which was calibrated using the laserdisc player) to reduce or even eliminate them.

Comparing the S-video output from both sources proved to be the real eye-opener. While the laserdisc image displayed the slight amount of chroma noise that is endemic to



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the format, the DSS picture was almost totally noise free. (Chroma noise manifests as horizontally moving streaks, which are especially visible in dark scenes.) In addition—and this surprised the heck out of me—the DSS picture revealed a greater level of detail than the LD. For example, you could clearly resolve the whiskers on Tom Hanks' face in the DSS picture; the LD rendered them as a dark blur. To be fair, the LD had a smoother, more "filmlike" look overall, which some viewers may prefer. Again, a slight adjustment of the TV's sharpness control would probably even this out.

I came away from the experiment impressed and a bit nonplused. Frankly, I expected the laserdisc to blow DSS away. Not only did it fail to do so, but DSS clearly bettered the LD in some respects. My conclusion: DSS is definitely capable of delivering "laserdisc-quality pictures," at least in the best-case scenario of the Direct Ticket PPV channels.

In terms of *sound* quality, however, the conclusion is not so clear. Lacking any way to generate a test signal over DSS, I could not match the audio output levels of the two sources. Unless levels are matched to within a fraction of a dB, direct comparisons are meaningless. All I can say with certainty is that the DSS audio was at least 3 dB lower than the laserdisc soundtrack. Perhaps because I was concentrating on the picture, I didn't notice the discrepancy until the launch sequence. Then, the LD suddenly seemed much louder than DSS.

There was one troubling aspect of DSS's sound quality about which I can be unequivocal. At various points throughout the film, the audio momentarily dropped out with an audible pop, after which it immediately came back. This occurred seemingly at random; it did not appear to be related to peaks. Although it only happened perhaps a dozen times (I didn't keep an exact count), it was very annoying. Fortunately, this problem seems to be an anomaly; I have not experienced it since.

In talking about DSS audio, I must emphasize that the RCA unit—like all currently available DSS receivers—was engineered for mass-market consumption, not for demanding, high-end audio/videophiles. Yes, the digital-to-analog converters are capable of delivering "CD-quality" sound, just like those in a cheesy \$199 CD player.

RCA and Sony have both talked about including digital outputs on future upscale models. (In fact, a Sony model with a digital output should be available by the time you read this.) But if you have an existing unit, Danby Radio, a high-end audio and DSS dealer in Ardmore, Penn., will add either a coax (S/PDIF) or an optical (TosLink) digital output to your DSS box for \$375 plus shipping. Contact them at (610) 649-7002 for details. I plan to have my DSS box modified soon, and I will report the results in a future "Take 2."

The artifacts of life

Up to now, I haven't said much about digital motion arti-

TV on Tap: DSS Programming Options

Dennis Barker

Although there are only two main sources of DSS programming—DirecTV and USSB—they both offer enough options and package deals to make buying a new car seem straightforward by comparison. (DirecTV is a division of General Motors, after all.) In addition, your local service company may offer their own packages as well. [For example, here in Santa Fe, the local service company is DirecTV of New Mexico—Ed.]

In any event, you must subscribe. Other than a few menus and preview channels, all DSS programming is encrypted, or "scrambled." Within moments after you call the service provider's 800 number to set up your account, a code is transmitted that unlocks your receiver and—*voilà!*—a picture appears. (They can also shut your box down just as quickly if you fail to pay your bill.)

How can the service providers address your specific receiver out of the millions in use? Every DSS receiver comes with an "access card" programmed with a unique serial number. This number identifies you to the providers and allows them to enable or disable your box.

The access card is also used by the providers to track your pay-per-view (PPV) purchases; it's a "smart card," which means it contains a memory chip that stores data much like a floppy disk. Each time you order a movie, the purchase information is stored in the card. Late at night once a month, your DSS receiver—which must be connected to a working phone line—automatically dials an 800 number and uses its built-in modem to download a list of your purchases directly into the billing computer located in Castle Rock, Colorado. Isn't technology wonderful?

Most DSS customers opt for the \$29.95/month DirecTV Total Choice package. All the basic cable channels are included: A&E, AMC, BET, Bloomberg Information TV, Bravo, C-SPAN, C-SPAN 2, Cartoon Network, Country Music TV, CNBC, CNN, CNN International, CourtTV, Discovery, Disney East and West, Encore (seven channels), E!, ESPN 1 and 2, The Family Channel, Headline News, The History Channel, HSN, The Learning Channel, MuchMusic, Newsworld International, Sci-Fi Channel, TBS, TNN, TNT, The

Travel Channel, TRIO, Turner Classic Movies, USA, The Weather Channel (national only—no local forecast), and a regional sports channel.

In addition, Total Choice includes access to over 50 Direct Ticket PPV channels, including two that run movies in letterbox format. Movies are priced at \$2.99 each. (If you purchase a PPV movie, you receive one coupon worth \$2.50 off that month's bill.) Special events, such as boxing matches and other one-time-only sporting events, cost somewhat more. The package also includes Music Choice, 29 genre-specific channels that play non-stop music 24 hours a day, with no DJs or commercials. (Unfortunately, there's no way of knowing what you are listening to at any given moment, unlike cable-based digital music systems such as DMX.)

For \$34.95/month, you can upgrade to the Total Choice Silver package, which adds Starz!, Starz!-West, and the Independent Film Channel to the basic Total Choice lineup. For \$39.95/month, sports fans can opt for Total Choice Gold, which adds Sports Choice (24 sports channels). And for the truly TV addicted, there's Total Choice Platinum (\$44.95 per month), which includes all of the above.

facts, DSS's most frequently cited and controversial drawback. Manifesting as a blocky, pixelated effect that obscures fast motion, motion artifacts are an unfortunate side effect of the MPEG-2 digital data-compression system that makes DSS (and soon, DVD) possible.

When DSS was first launched, the only viable video-compression option was the MPEG-1 standard. (MPEG, which stands for Motion Picture Experts Group, is an international organization that develops and maintains worldwide video-compression standards.) MPEG-1 was standardized in 1992 and was designed primarily for CD-ROM and telecom applications, *not* high-quality video. This is evidenced by its original maximum data rate of approximately 1.5 megabits per second (Mb/sec), which is the same as an audio CD.

In its original form, MPEG-1 provided video quality roughly equivalent to VHS tape. Fortunately, DSS was able to take advantage of an enhanced version (MPEG-1+) that had a maximum data rate in excess of 10 Mb/sec.

As mentioned earlier, DSS recently upgraded to MPEG-2 encoding. The upgrade was implemented at the encoding end; no modifications to existing DSS receivers are necessary. Intended from the start as a high-quality data-compression standard for TV pictures, MPEG-2 was codified in 1994 with a maximum data rate in excess of 10 Mb/sec.

MPEG-2 is a vast improvement over the earlier MPEG-1 system, which is still used to encode DSS audio. (MPEG-2 audio is defined for future multi-channel applications.)

Sound like TV OD? If so, you can buy a basic package called Plus DirecTV for \$14.95/month or Select Choice for \$19.95/month. [Here in Santa Fe, DirecTV of New Mexico also offers two different entry-level channel lineups starting at \$14.95/month—Ed.] Many channels are also available *à la carte*, so you can pick one of the basic packages and add your favorite channel(s) that would otherwise not be included.

Depending on the season, DirecTV offers several *à la carte* sports packages that provide virtually every NFL football game, NBA basketball game, NHL hockey game, major-league baseball game, and all weekend college football (or baseball) games. World-class boxing matches, NASCAR auto racing, championship rodeos, and other sports are also covered.

Last but not least, PrimeTime 24 provides access to the broadcast networks. For \$4.95/month, you get east- and west-coast feeds of CBS, NBC, and ABC as well as special nationwide satellite versions of Fox and PBS.

This brings up one of the few downsides to DSS: There's no local programming *per se*. To partially overcome this, PrimeTime 24 provides network channels from around the country. CBS East

is WRAL Raleigh/Durham, CBS West is KPIX San Francisco, NBC East is WNBC New York, NBC West is KNBC Los Angeles, ABC East is WJLA Washington, DC, and ABC West is KOMO Seattle. If you happen to live in one of those localities, you're in luck. Otherwise, you need a rooftop antenna or some type of "lifeline" service from your local cable operator to receive the networks and local programming in your area. (*Star Trek* fans take note: The new Warner Bros. channel and UPN are not available on DSS at all, so you need an antenna or cable to receive *DS9* and *Voyager*.)

You should also be aware that PrimeTime 24 is not available to everyone. To get it, you must be unable to receive the networks off the air (i.e., you live in rural area), and you cannot have received cable in the last 90 days. These absurd and unfair restrictions are the result of an FCC ruling designed to protect the cable industry. When you call to order, the operator will ask you two questions: 1) Can you receive a viewable signal from your local network stations? and 2) Have you subscribed to cable in the last 90 days? I'm not saying you should lie, but if you answer "no" to both questions, you're in.

The other DSS service provider is

I suspect that people who insist that DSS is plagued by digital motion artifacts haven't seen the system lately (if at all). Or perhaps they are attributing common NTSC artifacts—which are endemic to *all* current consumer video formats, including laserdisc—to MPEG encoding. Either way, in my opinion, they are beating a dead horse.

Although motion artifacts do occur, they are a highly overrated bugaboo. In the four months I've been watching DSS, I've observed *obvious* motion artifacts only a few times. There have also been a few times when I *thought* I was seeing artifacts, but unlike the noise that obscures every second of a cable feed or videotape, artifacts are there one moment and gone the next. If you blink, you might miss them.

Artifacts seem to be related to the compression rate as well as to the quality of the input signal. For example, I've never once seen an obvious motion artifact while watching the high-bandwidth PPV channels. On the other hand, the Home Shopping Network is allocated fewer bits; every time there's significant motion, the picture dissolves into a mosaic of colored blocks (which is an improvement, in my view!). During the Academy Awards broadcast described earlier, the poor-quality signal from KOMO broke up into noticeable artifacts during the big production numbers; the only time the better-quality WJLA feed broke up was during a hyperactive Revlon commercial.

Certain motions can push the MPEG encoder over the edge. The rapidly spinning figure skaters mentioned earlier are one example. Objects that move horizontally across the

USSB, which concentrates primarily on premium movie channels: MultiChannel HBO (five channels, all showing different movies), MultiChannel Cinemax (three channels), MultiChannel TMC (two channels), MultiChannel Showtime (three channels), and the new Sundance Channel, which runs independent films. All News Channel (ANC), Comedy Central, FLIX, MTV, VH-1, Lifetime, and Nickelodeon/Nick At Nite are also beamed via USSB.

USSB offers seven different packages, ranging from \$7.95/month (a basic package with no movie channels) up to \$34.95/month (USSB Entertainment Plus, which includes everything listed above). An HBO package (five channels) is just \$10.95. You get one free month of USSB Entertainment Plus when you purchase a DSS system, which is a good way of sorting out the channels you really watch.

There's one final item you should add into your DSS programming budget: a subscription to *Satellite Direct* magazine (call 1-800-285-5454 for info). Although the onscreen Program Guide is handy, it's simply no substitute for a comprehensive guide in paper form. —DB

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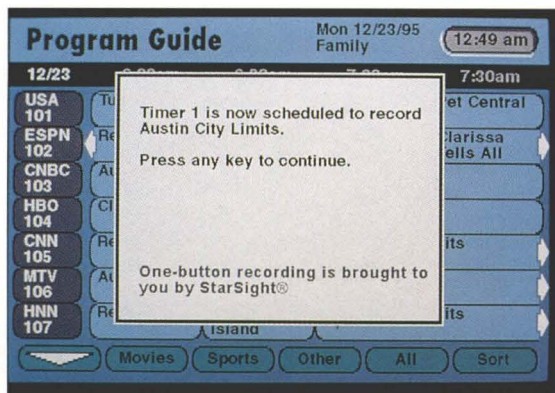
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The RCA's "One-button" VCR-control feature makes recording DSS programs a piece of cake.

screen in front of a complex background seem to be especially difficult as well. For example, in one scene of an episode of *ER*, the camera paused on a medium shot of Dr. Lewis's face. Suddenly, a person whizzed past in the foreground, trailing a wake of sparkling pixels that momentarily obscured Lewis's face. The entire event lasted a fraction of a second and was the only obvious artifact during that show.

Another example occurred during a nature documentary on the Discovery channel. In this case, a biologist was walking through a field of wildflowers, swinging a butterfly net back and forth like a pendulum. Just as on *ER*, the net left a trail of pixels in its wake. Also like *ER*, this was the only obvious artifact event during that particular show.

Considering the amount of programming that DSS broadcasts at any given moment, the system's overall picture quality is remarkably good. MPEG encoding is a relatively new art form, and like film-to-video transfer, it will surely get better with time. If DSS's quality is any indication, DVD—which doesn't have to dynamically share bandwidth between multiple programs to fit on the limited capacity of a satellite transponder—should look very good, indeed.

Rain, rain, go away

Another common complaint is that DSS breaks up in bad weather. Known as "rain fade," this phenomenon can and evidently does occur. I can't describe what it looks like, though, because I experienced no change in signal quality whatsoever during the light rain and snow showers we had in Santa Fe this winter. An inch or two of snow and ice on the dish also seemed to cause no ill effects.

However, other DSS owners have told me they've experienced rain fade during heavy downpours and snowstorms. Whether you'll suffer any ill effects depends on the strength of the signal you get from the satellite in the first place, and this varies according to your geographic location and particular installation. A proper installation where the signal has been peaked will minimize any potential problems.

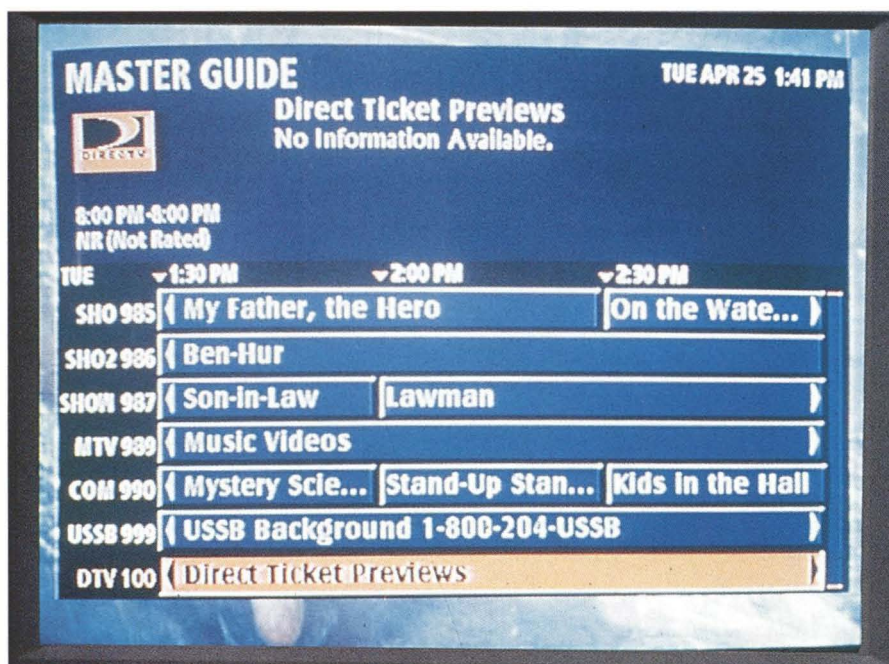
Quantum leap

If you use your home theater strictly to watch blockbuster movies and don't mind buying or renting discs, more power to you. Buy 'em, build a library, and enjoy. Laserdisc is still the king of the video heap, and nobody's forcing you to toss your player into the dumpster—yet.

But consider this: Do you really want to own physical copies of all those movies, or do you just want convenient access to a huge film library? DSS offers more than 50 PPV channels, 24 hours a day. True, you can't pause, rewind, or fast-forward through a PPV movie. (This is a big disadvantage for those of us with toddlers.) Other than that, the PPV channels compare *very* favorably with LD. But that's just icing on the cake.

What's truly exciting about DSS is that it provides a quantum leap in performance for the vast majority of programs that will *never* appear on disc. Classic movies, sports, children's programs, *NYPD Blue*, even *Headline News*—they may not be quite "laserdisc quality," but all of these programs look and sound better on DSS than they do on tape, cable, or broadcast. As far as I'm concerned, DSS would be well worth the price of admission even if it did nothing else.

DSS delivers a panoply of programming and convenience options that simply aren't available with any other medium; it "adds value" to the TV-watching experience. And come to think of it, isn't that what home theater is all about? **SGHT**



Navigating around the Sony's Master Guide screen is fast and easy thanks to the unit's 32-bit microprocessor and trackball remote.



Bent pipes

DSS uses high-flying digital technology to beam entertainment to your home.

Satellite systems are nothing new; traditional, large-dish, analog, "C-band" setups have been around for years. Unfortunately, these systems are expensive. In addition, they are complicated to install and operate, in large part because the dish mount must be motorized to pivot a 7- to 10-foot dish from horizon to horizon so it can aim at a large number of different "birds." (To be fair, C-band advocates point out that the ability to point at different satellites enables big-dish owners to receive a greater variety of programming, including many free channels and local/regional shows unavailable to DSS owners.) Last, but not least, many municipalities and homeowners' associations have banned big dishes for aesthetic reasons.

By comparison, the Digital Satellite System uses a lightweight, 18-inch dish on a simple fixed mount. Like a broadcast-TV antenna, the dish assembly attaches with a few screws to almost any exterior surface (wall, chimney, pole, etc.). As long as the mounting position has a clear line of sight to the southern sky, and assuming you can snake a coax cable from the dish to the inside of your house, you're in business.

How can DSS get away with such a

small dish and a fixed mount? First of all, the system relays digital signals via three satellites parked in a geostationary orbit 22,300 miles above the equator, due south of Texas at 101° west longitude. Because the satellites—known as DBS-1, DBS-2, and DBS-3—are clustered tightly together in a "constellation," the dish can capture signals from all three without moving.

In addition, the DBS satellites are new, high-power models. This allows for a smaller receiving dish and enables each satellite to handle greater overall bandwidth. By reducing the audio/video datastream with digital data compression and maximizing signal flow in real time with an extremely powerful, computerized uplink system, the three satellites can relay up to 200 channels simultaneously.

Mission control

The hub of the DirecTV entertainment service is the Castle Rock Broadcast Center. Located in Castle Rock, Colorado, the Broadcast Center is one of the most sophisticated television transmission facilities ever built, and is the first all-digital broadcast facility in North America.

Lawrence E. Ullman

in Space

The Center's specs are impressive. According to their brochure, a fully automated Sony broadcast system "processes and sends up to 216 video and audio channels simultaneously," while a 512-input x 512-output Sony digital routing switcher carries "four audio signals with each video signal." Movies and other tapes are automatically played by 56 Sony Flexicart robotic videotape systems, while two 1000-cassette Sony Library Management Systems compile commercial and promotional messages for on-air playback.

In addition, there are 56 Thomson/CLI multichannel MPEG-2 compression systems and four 13-meter transmitting antennas served by 54 high-power uplink transmitters. Other facilities include six 6-meter, C-band, receive-only dishes and two 4.5-meter, Ku-band, receive-only dishes.

Everything is coordinated by state-of-the-art scheduling software. And just in case, there's a complete emergency power system with three 1.5-megawatt generators, a back-up electrical system with uninterruptible power supply (UPS), and a 100,000-gallon fire-suppression system. After all, the show must go on!

The broadcast process

Program material is delivered to the Broadcast Center via traditional C-band satellite downlinks, fiber-optic land lines, videotape (all formats, including professional D1 Digital Betacam), and even standard phone lines. Most live satellite broadcasts are immediately digitized, encrypted, and uplinked to the DBS satellites for retransmission to the dish on your house. Other live programs are recorded on Digital Betacam for later broadcast.

As I noted in "DSS: The Sky's the Limit" (which immediately precedes this article), pre-recorded tapes undergo a Quality Assurance/Formatting and Editing (QA/F) process in which technicians, according to the brochure, "view and analyze program tapes using sophisticated post-production equipment to ensure audio and video quality." The end result of the QA/F process is a "house master" tape that has been optimized for digital compression.

The house master tapes then move to the Multi-Format Dubbing (MFDB) area, where so-called "identical-quality copies" are made for each broadcast day. This is also where interstitial and promotional messages are compiled for playback. Next, it's on to the Playback and Record Systems (PARS), where 56 robotic Flexicart systems house 224 Digital Betacam machines that automatically play back movie, promotional, and other tapes daily.

The output from PARS is routed to the Uplink Signal Processing System (USPS), which encrypts and compresses the video and audio signals using MPEG-2 and MPEG-1 encoding, respectively. (Up to this point, video and audio signals flow through the plant in the digital domain as 270 Mb/second, *uncompressed* digital data.) Finally, the onscreen Program Guide and other system-overhead signals are multiplexed together with the audio/video data to form a single, serial, digital datastream for each satellite transponder.

Finally, the signal flows to the Uplink RF System (URFS). Here, the datastream is modulated to an intermediate frequency, which then proceeds into amplifiers that power the actual satellite-uplink antennae.

The bent pipe

"Although the technology behind satellites is obviously very sophisticated," says Jeff Crosby, DirecTV's Vice President of Digital Satellite Systems, "from a functional standpoint, they are really pretty simple. Basically, the satellite has a large receiving

DSS and Component Video

In "Component Parts" and the WCES '96 show report in our last issue (Spring 1996, Vol. 2 No. 1), Thomas J. Norton discussed the many picture improvements that would result if manufacturers took advantage of the native component-video capabilities of the upcoming Digital Video Disc (DVD) format. Well, the DBS satellites beam the video signal to your dish in component form, so the exact same arguments apply to DSS.

To output a standard composite video signal, the DSS receiver must combine the three video components (Y, R-Y, and B-Y) using a Byzantine process known as NTSC encoding. As

with a digital-to-analog converter, an NTSC encoder can be implemented with varying degrees of quality. But no matter how well implemented an encoder may be, the process inevitably results in signal degradation.

Just as with DVD, the solution is to equip DSS receivers with component-video outputs and skip the NTSC encoding/decoding step altogether. Of course, this assumes the use of a video monitor with component inputs. The trouble is, other than high-end video projectors and line doublers, almost no component-video-equipped monitors are sold in the U.S. Thanks to DVD,

however, this may soon change.

In what we hope will be a trend-setting move, Toshiba has promised at least one of their DVD players will have component outputs, and the company has shown a new widescreen rear-projection TV with component inputs to go with it. If other manufacturers follow suit, component inputs could soon become commonplace (at least on high-end models). Toshiba will soon be offering DSS hardware as well, so one can only hope they'll take the next logical step and be the first manufacturer to offer a DSS receiver with component-video outputs. We'll keep you posted. —LEU

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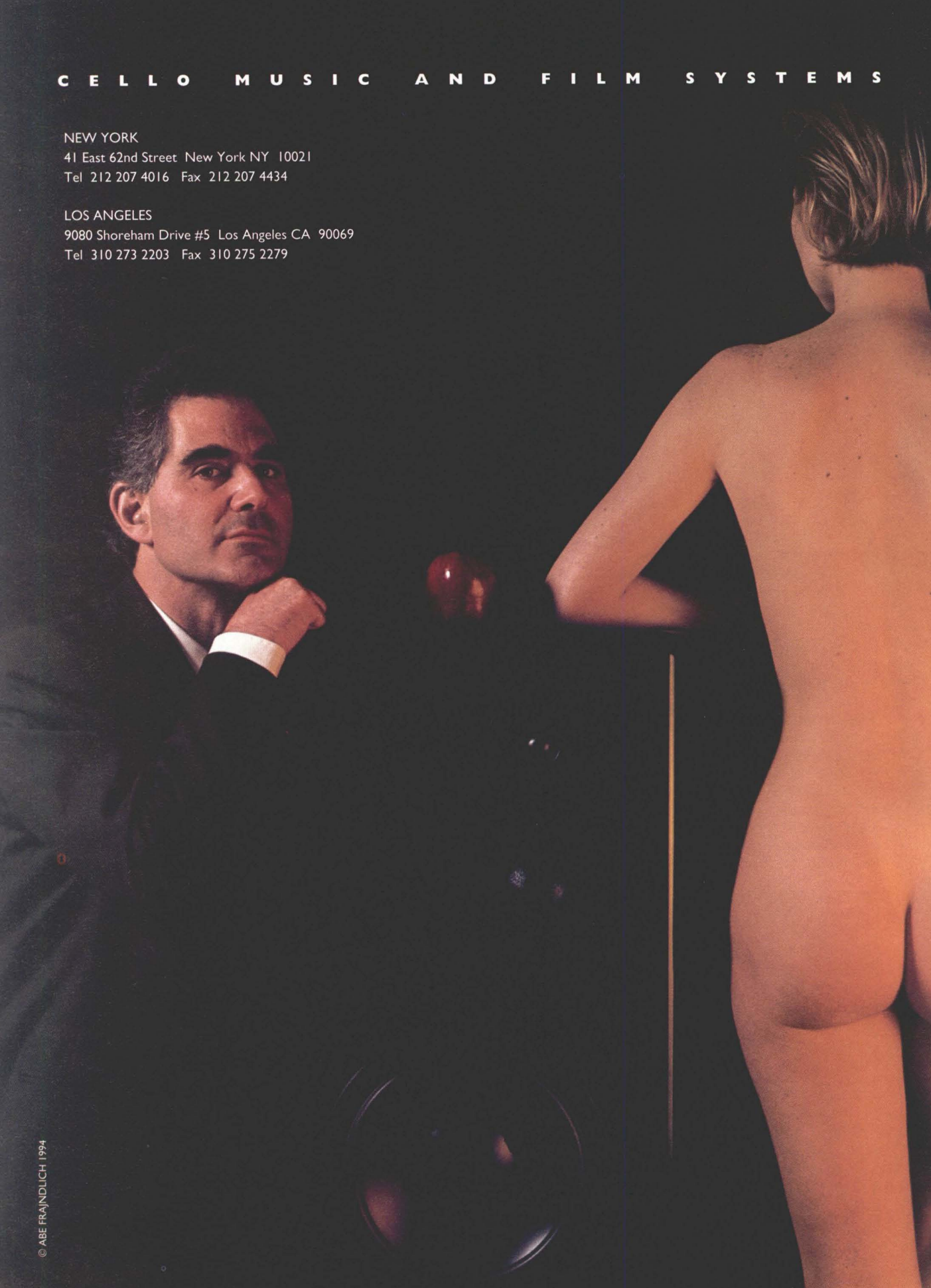
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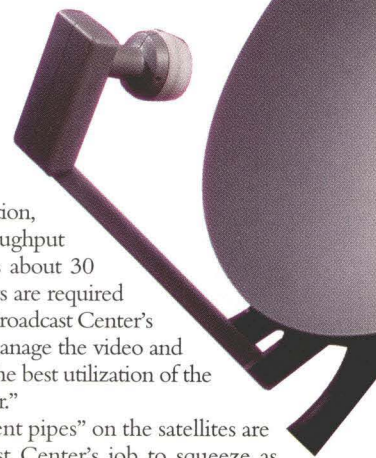
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antenna and a large transmitting antenna. The signal comes in on the receiving antenna at a particular frequency, goes through some filtering, gets translated to a different frequency, runs through some amplifiers, and is sent out the transmitting antenna back towards Earth. Most of the hard work is done on the ground; there's very little processing done onboard the satellite itself. In fact, in the trade, satellites are sometimes referred to as 'bent pipes.'

The conduit through which all signals flow is a type of amplifier called a *transponder*. Each satellite contains a total of 16 transponders that normally output 120 watts each. However, pairs of transponders can be bridged (much like the channels of a stereo audio power amplifier), resulting in eight 240W transponders. According to Crosby, "The higher power means you can get away with fewer bits of error correction. That means you have more data leftover for additional programming.

"The filters on the satellite know which frequency to look at for a given transponder," says Crosby. "For example, transponder 1 on one satellite looks for a 17.3 gigahertz signal. That signal is translated to 12.2 gigahertz and transmitted back to Earth. The transponder bandwidth is 24 megahertz, which stays the same throughout the system. We try to put as much information through each transponder as possible."

One technique used to increase the number of transponders that can be utilized within a finite frequency spectrum is *signal polarization*. According to Bill Mengle, DBS Product Manager for Thomson Consumer Electronics, "Polarization supplies additional isolation between adjacent signals and provides a path for frequency reuse.

"For example, terrestrial television signals are horizontally polarized and the antennas used to receive them are oriented horizontally. If that same television antenna were oriented vertically, its reception capability would decrease by as much as a factor of 10 or more. As a result, weak signals would become even weaker and some may no longer be able to be received at all.

"DSS uses *circular polarization*," explains Mengle, "which might be best compared to the clockwise or counter-clockwise threads of a screw. Depending on the transponder, the DSS signals are either left-hand or right-hand circular polarized.

"When the first satellite, DBS-1, was launched, it was configured for 16 120-watt transponders," says Mingle. "They transmit in the left-hand circular polarized configuration. DBS-2 was also configured for 16 120-watt transponders, but they used right-hand circular polarization. However, when DBS-3 was put into service, DBS-2 was reconfigured to match the new satellite: with eight 240W transponders and right-hand circular polarization."

In other words, DSS as currently configured uses a total of 32 transponders: The 16 on DBS-1 transmit 120-watt, left-hand circular-polarized signals, and the remaining 16, which are divided between DBS-2 and DBS-3, transmit 240-watt, right-hand circular-polarized signals. This is important, because the number of transponders and their power has a direct bearing on the system's overall performance, or "throughput."

Controlling the datastream

According to Mengle, "A 120-watt transponder provides roughly 20 megabits per second (Mb/sec) throughput, after error cor-

rection, Program Guide information, and so forth. In contrast, the throughput on the 240-watt transponders is about 30 Mb/sec, because not as many bits are required for error correction. One of the Broadcast Center's most important functions is to manage the video and audio programs so they achieve the best utilization of the available bits on each transponder."

To put it another way, the "bent pipes" on the satellites are fixed in size. It is the Broadcast Center's job to squeeze as many datastreams through the pipes as possible without sacrificing too much in the way of performance. The key lies in optimizing the number of bits allocated to each datastream during the MPEG-2 encoding process.

DirecTV's Crosby explains: "The data rate from the MPEG encoder is variable, depending on two factors. First, it depends on the source material itself. For images that have lots of motion, say from ESPN, the nominal data rate is going to be higher than something that has very little motion, such as Court TV.

"The data rate is also variable over time. We use a technique called 'statistical multiplexing,' which is a way of creating a real-time demand system for the bits of information as needed by the source material. For example, let's say ESPN and Court TV are carried on the same transponder. You need more bits in the middle of a basketball game than you do when the program cuts to a commercial that might have low motion. Statistical multiplexing supplies more bits when they are needed by the basketball game, and then lets those bits be used by another channel on the transponder during the low-motion part. Because we're not wasting bits when they're not needed, we can improve picture quality and increase the number of channels we can offer."

As a result, the nominal data rate—and thus, video and audio quality—of each DSS channel constantly varies. "There's really no 'normal' data rate," says Crosby. However, DirecTV does set minimum and maximum rates for each channel. (DirecTV will not divulge what these rates are). According to Crosby, they must set minimum rates for each channel; otherwise, upon seeing fast motion on one channel, the system might "suck so many bits away from another channel that the quality on that channel would fall below an acceptable level. We set a maximum rate for similar reasons."

Both Mengle and Crosby insist that, from the user's perspective, there's no apparent performance difference between channels relayed via high-power and low-power transponders. According to Crosby, "You can have any channel on any transponder; they are 'virtual channels.' Channel mapping is actually performed through data in the Program Guide. When the user selects a channel, the data in the Guide tells the DSS receiver which transponder it needs to look at. The tuner then outputs the appropriate voltage to the LNB [low-noise block, the actual receiving element on the dish] to grab the appropriate polarity, whether it's right-hand or left-hand circular. It's all transparent at the user end."

SGHT



Discrete Indiscretions

MICHAEL FREMER:

I went to my local "tenplex" last year to see *Apollo 13*. With its cramped little boxes, small screens, asymmetrical projection angles, and generally mediocre sound, it's not my favorite film venue, but they were showing Opie's opus in "DTS" digital stereo and—believe it or not—I hadn't yet heard the format. So, reluctantly, off I went.

Michael Fremer says

No!

Is discrete
digital
surround
ready for
prime time?

Thomas J. Norton says

Maybe!

Not all of the theaters at that tenplex are awful; a few of the larger ones aren't too bad (if you can see over the teased *Joisey*-style hairdos), and since *Apollo 13* was a hit and in DTS, I figured it was being shown on one of the better screens. But no; I found myself in a casket-sized theater. The lights went down and the muffled, compressed sound came up. There were no highs, no lows, no dynamics, and certainly no stereo surround effects.

Surely this wasn't DTS digital sound! And it wasn't. The Cineplex Odeon management had pushed *Apollo 13* into a third-rate Dolby Stereo optical-track theater to make room for something else, but hadn't bothered to change the newspaper listing. Sonic "bait and switch"—yet another reason to stay home.

The dull sonic haze and barely audible dialog demonstrated how much better home-theater sound—even "old fashioned" Dolby Pro Logic home-theater sound—can

THOMAS J. NORTON:

As Michael Fremer points out in his article, I recently auditioned DTS's home version of discrete digital surround in my home-theater system. The program material consisted of the three (currently) available DTS-encoded laserdiscs: *Jurassic Park*, *Apollo 13*, and *Casper*. As I write this, only a limited number of pressings of each title have been produced for industry use. However, DTS has indicated that they will be available to consumers, and additional titles may also be forthcoming.

The DTS processor I used is a professional unit on loan from DTS. As of this writing, there are no commercially available consumer DTS decoders, though several manufacturers of upcoming high-end surround processors have made provisions on their circuit boards for the DTS chip, which is currently under development by Motorola. [For details, see "The Chips are Down" in this issue—Ed.]

The six audio outputs from the DTS decoder were fed into a Chiro C-800 surround processor, which is equipped with a DB-25 computer-style port for use with an outboard, 5.1-channel decoder. A commercially available, multichannel, Monster Cable interconnect with six RCA plugs on one end and a DB-25 connector on the other linked the DTS decoder with the Chiro.

The remainder of the system was the same as that used for the equipment reviews I did for this issue, though when MF visited I was using Monitor Audio left, center, and right front loudspeakers.

My impressions of the DTS system remain as favorable as I

be. I've since heard both DTS and Dolby Digital theater sound and yes, both offer the *potential* for profound improvements in frequency extension, dynamic range, clarity, and spatiality compared with optically read Dolby Stereo. To my ears, though (as best as they can remember), no "modern" sound-delivery system touches 70-mm 6-track analog magnetic tape. Unfortunately, that format and very large theater screens mostly disappeared in America around the same time as civil political discourse.

But does better commercial theater sound via Dolby Digital or the more widely available DTS mean you or I should invest in a 5.1-channel, discrete-digital home-theater system today?

Because they could

For the majority of us, I say no for now. Why? Many reasons, the first of which is the quality of the current discrete mixes. Last week I went to see *The Birdcage* at the tenplex, this time (as advertised) in DTS stereo. It featured one of the lamest soundtrack mixes I've ever heard, aided and abetted by five fully discrete, full-frequency-range channels.

The ham handed mixers had placed much of the source music in the surround tracks and at very high sound-pressure levels. Why? Not because the music belonged there—the stage from which it was supposedly emanating was on screen. They did it for the same reason dogs lick their private parts: because they could.

Exacerbating their bad taste was the 180-degree tonal imbalance between the big horn speakers behind the screen and the small, dome-tweetered, sealed-box surround speakers ringing the room. When the music was placed behind the screen it sounded "horny." When it was plopped into the surround tracks it sounded bright and tizzy like a bad car stereo. Instead of increasing the viewer's sense of involvement in the film, it only served to distract. It was *loud*, and I was sitting in the center aisle. I can't imagine what it must have been like for moviegoers parked closer to the side or back walls.

Worse, throughout the film, whenever anyone spoke on screen, the mixers put a muffled, digitally delayed version of the dialog in the surround tracks. Why? Again, because they could. What

reported in our last issue (see "Behind the Scenes," Summer 1996, Vol. 2 No. 2). The bass in my system was less effective, however—hardly anemic, but less solid and tight than the best Dolby Digital bass. This was clearly due to the rather clunky setup I had to use to consolidate the bass into two subwoofers (one for front and LFE, the other for the surrounds).

Making allowances for the brightness of two of the soundtracks—*Apollo 13* and, particularly, *Jurassic Park*—the general sound quality was all that could be hoped for from the best current soundtrack mixes. And there was a genuine coherence to the soundscapes, with real images between the front loudspeakers (for example, between L&C and C&R) and well to the outside of them.

In pure audiophile terms, the sound from the DTS discs was superior to the best I have heard from Dolby Digital. But this is as it should be. The laserdisc incarnation of DTS occupies the space normally used on the disc by both the L&R conventional digital audio tracks; Dolby Digital requires just one of the analog tracks. DTS

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was coming from the surround tracks might as well have been coming from Mars for all it had to do with the business on screen. It was totally distracting.

At one point someone played a piano off screen. Because they could, the mixers panned the piano hard right on both the right front and right surround channels. They'd created a gigantic piano stretching from the screen to the back of the theater. Did most of the moviegoers hear any of this or care? Probably not. But I'm not most moviegoers, and since you're reading this, neither are you. Anyone who really listens to what's going on in a movie soundtrack would have to be appalled by this discrete-digital mix of *The Birdcage*.

Which brings me to the first reason you should hold off spending big bucks for a Dolby AC-3-based home-theater system: the learning curve. It will take time for most film mixers to get over the novelty of being able to place sound in five discrete tracks. If *The Birdcage* is any indication (and I think it is), many are still learning. They've got a long way to go.

Packing it in

I suspect you've heard a great deal about the issue of digital audio compression in the last few years. In case you haven't, here's the gist: Without some form of digital compression, a 5.1-channel discrete-digital soundtrack cannot be squeezed into the limited space allocated for sound on film (or laser-disc). Dolby's solution is AC-3 encoding, a data-compression scheme that uses "perceptual encoding" to squeeze 10 pounds of audio into a five-pound sack.

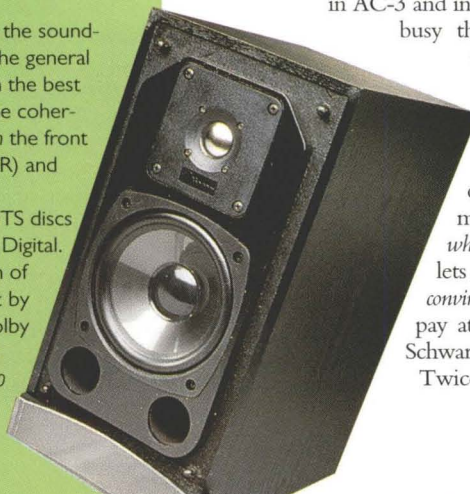
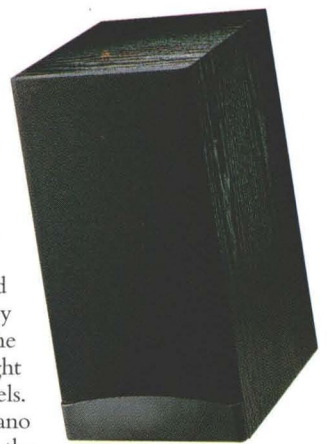
Perceptual encoding means the system discards information that you supposedly will not miss—information, it is claimed, that the ear/brain cannot perceive because it is "masked" by close frequency and amplitude proximity to other information that you *do* receive. In theory, the compression is "inaudible" or barely audible. In practice, I find it very audible and usually very annoying.

I've participated in a few dozen consumer-oriented home-theater seminars co-sponsored by Toshiba and various consumer-electronics retailers. It is a relatively noncommercial, information-packed enterprise lasting three hours in which a Toshiba representative talks about video and I talk about audio.

When I expressed my reservations about Dolby AC-3 at one of the seminars, a salesman invited me into the store's AC-3-equipped home-theater room to watch a scene from *The Lies* in AC-3 and in Dolby Pro Logic. The store was busy that Saturday morning and the room was crowded, so I took it upon myself to ask the customers to listen along.

I told them to listen both to the spatial and timbral qualities of the presentation in both formats. They listened not just to *where* the explosions and flying bullets were coming from, but to how *convincing* they actually sounded. And pay attention, I told them, to Arnold Schwarzenegger's voice.

Twice we watched the scene where



Michael Fremer says

No!

he blows up a building and gets chased down a mountain, finally meeting up with

Tom Arnold: once in AC-3 and once in Pro

Logic. Everyone agreed—to the person—that while the AC-3 presentation was more focused spatially, timbrally it was thin and flat. Arnold didn't sound like Arnold in the AC-3 version—his deep voice was lean and disembodied. The explosions sounded strangely simplified, shadowy, and cartoonish.

Nonetheless, some listeners felt the AC-3 presentation was more exciting. Most though, were surprised to find themselves agreeing with me that overall sound quality was more important to them than razzle-dazzle spatiality. I have heard many demonstrations of AC-3 at consumer electronics shows, press events, and even at Dolby Labs. They've all given me a big pain in the ear with their thin, strident sound.

When I read articles about AC-3 from video reviewers who spout Dolby's party line without dealing with the digital-compression issue, I know better than to take anything they write seriously. So should you. None of them write for this magazine, of course.

The good news is that the encoding algorithm that controls the digital compression is upgradeable and is being improved on an ongoing basis. No changes to the decoding hardware are necessary for the improvements to be heard at home. Again, there's a learning curve involved. I hope the compression will become transparent (or nearly so) at some point. For now, I find the sound of Pro Logic easier on the ears.

Pain in the rear

Then there's the issue of whether discrete, full-frequency, wide-dynamic-range, stereo surround channels add to the cinematic experience or detract from it. Does a split surround draw you into the action or away from it? Again this is partially an issue of mixer finesse. But beyond that, I believe what works well in a large, darkened auditorium may not successfully translate to the average home environment.

In a large theater, a sound appearing way behind or way off to your side in the dark may have the intended effect of startling you, or placing you in the middle of the action. But at home, depending on where you place your surround speakers, it may just leave you hearing a discrete noise coming from one of your surround speakers. Instead of drawing you into the movie, the sound may distract you from it. Remember, movies are mixed in large rooms for playback in large rooms.

With a properly set-up Pro Logic system, the rear-channel speakers should disappear, leaving you immersed in an ambient atmosphere. Admittedly, an AC-3 mix can also do this, perhaps more convincingly, but until the mixers get over the novelty of pinpoint 5-channel placement, the distractive quality of the format will probably continue. And unless you can mount your speakers a sufficient distance away from your ears, I'm afraid a discrete sound source will always distract.

Then there's the issue of the stereo "sweet spot." In 2-channel audio, the sweet spot is centered between the speakers. It's the only listening position where the stereo image is presented correctly. Since critical music listening is generally a solitary experience, that's fine.

Home theater, on the other hand, is usually a *group* experience. The whole purpose of the center channel is to provide a focus so that everyone watching, regardless of their position relative to the front left and right speakers, hears the image correctly placed in space. With two discrete surround chan-

nels, we've come full circle back to stereo's old problem, only this time, the sweet spot is in the *rear*. If you're sitting closer to one surround speaker, the precedent effect will have you hearing *it* instead of a well-focused stereo surround image. No one's talking about that problem.

The software shortage

Just how many movies have been mixed in discrete 5- or 6-channel sound? Not that many, really. While a good number of vintage fifties and sixties movies were released in 70 mm discrete 6-track sound, most were mixed to mono. With the advent of optical Dolby Stereo during the seventies, more films were mixed to four tracks for matrixed left/center/right/mono surround release, but far fewer were released in 70 mm. Of those that were, even fewer were really mixed to six tracks; most used the already generated 4-track mixes and simply added two frequency-limited "boom" subwoofer tracks.

Since much of Hollywood's 6-track discrete catalog has already been issued on Dolby Pro Logic laserdisc, chances of those titles reappearing on laserdisc in 5.1-track discrete digital surround are slim. If (when) DVD catches on, more of these 6-track mixes will probably be reissued in AC-3, but that could take a few years.

Only in the last few years, with the advent of DTS, Dolby Digital, and other discrete-digital theater-sound delivery systems, has Hollywood started to generate large numbers of discrete mixes capable of taking full advantage of AC-3. True, the 4-track mixes of the past two decades can now be delivered discretely instead of matrixed, but they were originally mixed with the matrix in mind. How successfully they translate to a discrete format will be interesting to hear.

DTS at the pawnshop

I recently spent an evening at *SGHT* Technical Editor Thomas J. Norton's house watching *Casper* in DTS discrete digital sound. Sitting down to watch

Thomas J. Norton says

Maybe!

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also runs at a *much* higher data rate than the Dolby system: over 1.4 Mbit/second vs. 384 Kbit/second for Dolby Digital. If DTS makes it to DVD as an alternate sound format, it will have to operate at a much lower data rate, as well—that will give us a better idea of how DTS compares to Dolby Digital on a more level playing field.

Nevertheless, in its current form, there is a smoothness and lack of top-end grain to the DTS system that continues to elude Dolby Digital. I am still enthusiastic about the latter, which improves gradually with each new software release. (The early *True Lies* referred to by MF is one of the worst-sounding Dolby Digital titles—grainy, bright, and in-your-face. However, the soundtrack was just as obnoxious when I saw the film in the premier Cineplex Odeon Century Plaza theater in L.A. in 70 mm 6-track analog.)

They do what they do

As to the larger issue of how surround sound is put to use on a film soundtrack, MF finds the excessive use of discrete surrounds to be distracting. Certainly, *Casper* is an extreme case. I have never heard a soundtrack with such an aggressive (take

this film reminded me of being dragged over to the homes of audiophiles in the early '80s and being forced to listen to a phonograph album called *Jazz at the Pawnshop*, a superbly recorded live set featuring Scandinavian musicians playing Dixieland. Just what I wanted to hear: Scandinavians playing Dixieland! If the recorded sound hadn't been so damn good, would anyone have played the album? No!

If *Casper* didn't sound so good, and if it wasn't one of three titles Universal has issued in DTS (pressing quantity of 50 each, I was told), would I be sitting there watching it? Not a chance! Talk about an esoteric listening experience: Here I was watching an ultra-rare DTS pressing decoded by an even rarer DTS home-decoder prototype.

How did it sound? Better than any AC-3 demo I'd ever heard, timbrally. But while some of the spatial effects in the gimmicky movie worked well, others were extremely distracting, even though TJN's listening room is pretty much ideal. In a more perfect world, DTS would probably be the standard, but this isn't a perfect world, and it's one in which there's room for only one home digital-surround format.

Look before you leap

Yes, Dolby Digital (AC-3) is coming, and at some point it will make sense to make the switch. But nothing I've heard or seen up to this point suggests to me that the time is now. In fact everything points the other way, whether you're buying your first system or looking to upgrade what you already own.

If you're shopping for your first home theater, you've probably got a fixed budget. As a long-time audiophile, I can tell you that setting up a good-sounding 2-channel system is expensive. Five channels? *Very* expensive! To really do Dolby Digital right, you need

that word any way you like) mix. In a movie as lightweight as this one, however, I consider such a soundtrack to be a plus. Taken on its own, the *Casper* soundtrack is one of the best around.

But if the movie itself were more substantial, would the soundtrack detract? Where do you draw the line on the use of discrete surround effects? When does enhancement turn into distraction? Can discrete surround effects *ever* be used to increase realism without actually pulling the audience out of their involvement in a film? Are film-sound mixers really overdoing it "just because they can," as MF suggests?

In my judgment, movie sound mixers just "do what they do." Some are better than others at it; some always will be. Whether or not they are attempting to simulate reality depends on the film; in a big special-effects-laden spectacular, don't expect subtlety. There is no "right" answer to "how much is too much" when it comes to the active use of discrete surrounds. It is very much an artistic decision made by the director and the sound mixers.

The best we can hope for here is that the director, in particular, recognizes the power that sound has on the audience—to draw us into the film or push us away. Unfortunately, those of us attuned to listen critically to sound have a different threshold for sonic distraction than the general public does, and it is the general public for whom a film is mixed. For that reason, I can see the preference of some critics for Pro Logic, with its inherently fuzzy surrounds.

The same goes for Pro Logic's subtly blurred, softer, sometimes more subjectively sweeter timbre. My crystal ball appears well attuned here; I commented on this possible critical preference in my initial evaluation of AC-3 vs. Pro Logic nearly a year ago in *SGHT* Vol. 1 No. 2.

five full-frequency loudspeakers, two subwoofers (one for the front channels, one for the rear), a Dolby Digital source component (laserdisc today and *eventually* DSS and DVD), and an AC-3-equipped receiver or separate decoder with full power available for all five channels.

That is an expensive grouping of components. Better to have three good channels and skimp on the less important surrounds than to invest in five equally bad channels and a much more expensive AC-3-equipped receiver or processor. The most I'd do now is purchase "AC-3-ready" electronics.

If you've already set up a receiver-based Pro Logic home theater, look what you've got to do to make it AC-3-ready: replace your receiver (or add an AC-3 processor and more powerful amplifiers for the rear channels), replace your laserdisc player, probably replace your rear speakers, and add a subwoofer for the rear channels. In other words, basically replace your whole system. For what? A handful of titles, most of which probably feature inept, gimmicky mixes? Why? So you can be the first on your block? I don't get it.

If you own a modestly priced home theater and are looking to upgrade, consider investing in better front speakers or a better video-display device before chucking your Pro Logic electronics for Dolby Digital. Or upgrade to separate components that are AC-3-ready. Only after switching to AC-3 would I upgrade the surround speakers. Then I'd make sure they were easily switchable from dipolar to bipolar, so I could still get the most from the majority of software—which will be Pro Logic for quite some time. —MF **SGHT**

A wise investment?

As for the wisdom in investing in AC-3 at the present time, you will certainly read a variety of views in these pages. Waiting for a larger selection of software is certainly a valid choice. If I were a consumer with a fairly new and perfectly satisfactory A/V receiver or surround processor—especially an expensive one—I might wait a while myself. But if I were in the market now for a new receiver or processor, I would certainly consider the Dolby Digital option.

If however, you decide to wait on Dolby Digital—or DTS—until film sound mixes are, by purist standards, more intelligently assembled, you will be waiting a very long time. There are many good soundtracks around, but there's still much room for improvement, both in overall quality and in the use of surround-sound. There is a great deal of inertia in the film business. Soundtracks have improved in the last 20 years, thanks largely to improved formats and better theater sound systems.

Better hardware usually encourages better software, though the relationship is by no means one-for-one. Theater sound systems have probably gone about as far as they are going to go for the foreseeable future. Unfortunately, except for a few flagship theaters in large cities, most are mediocre at best. But if film-sound mixers see a large established base of good home-theater sound systems, many of them capable of demonstrating their efforts far better than most movie theaters, *that* reality may produce the next big improvement in sound-track quality. —TJN





Master Craftsman Jacob Albright



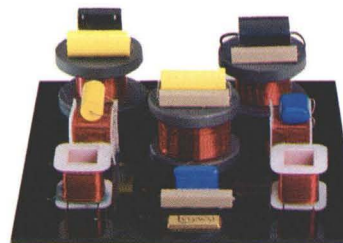
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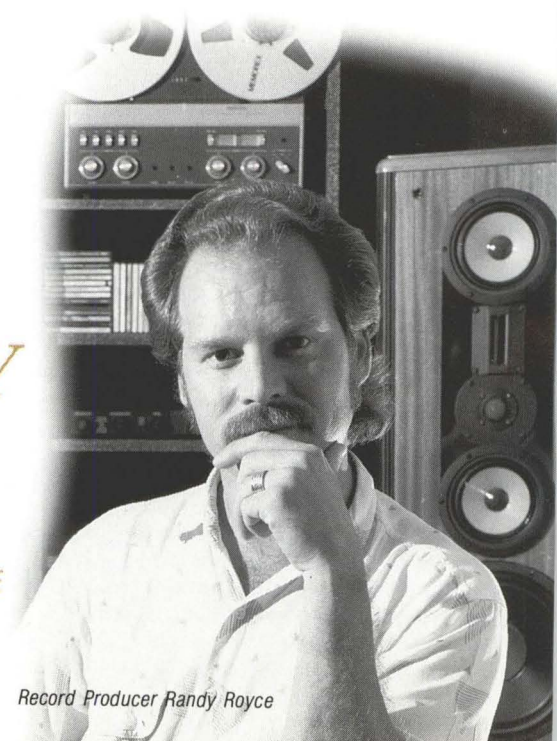


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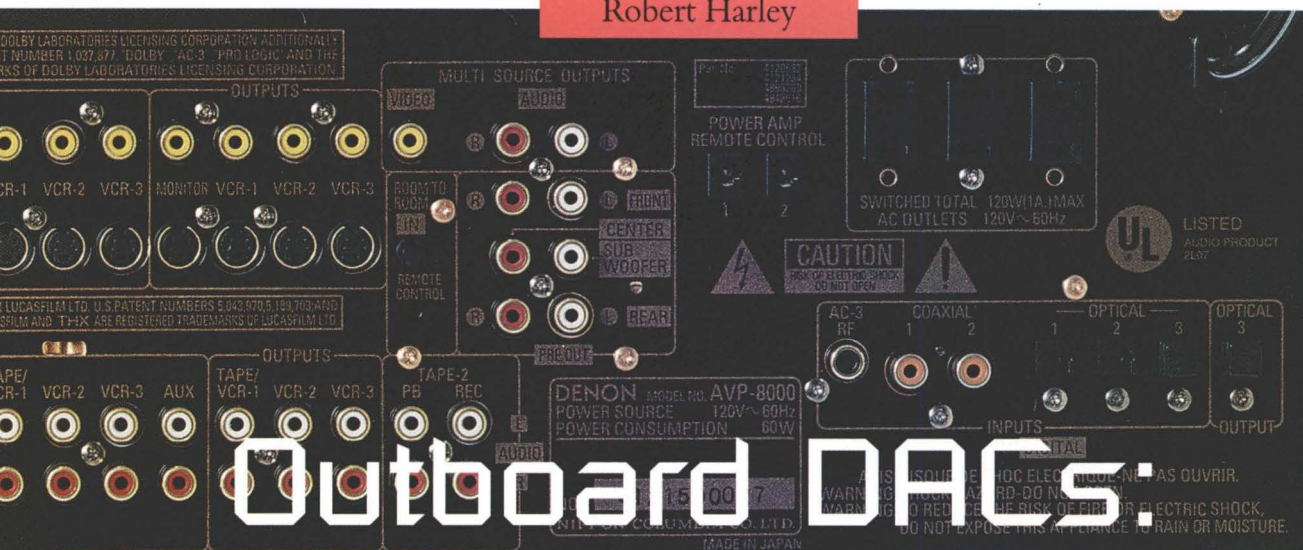
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Outboard DACs: A Sound Upgrade

Is your laserdisc player compromising the sound

of your home theater? Add an outboard
digital-to-analog converter
and discover what
you're missing.

If you're like most home-theater enthusiasts, you've run a pair of interconnect cables from your laserdisc player's left and right analog audio outputs into your A/V preamp or receiver. Although this connection method works, it could very well be the weak link that compromises the ultimate sound quality of your entire home-theater system.

Every laserdisc player made in the past eight years or so can read the digital sound tracks stored on a laserdisc. [Lasdiscs also have a pair of analog sound tracks, which may carry a duplicate of the digital tracks, director's commentaries and the like, or AC-3 data—Ed.] The laserdisc player converts those digital 1s and 0s into an analog audio signal that feeds your surround preamplifier or receiver. The circuit that performs this sonically crucial job is called the "digital-to-analog converter," or "DAC."

Unfortunately, the digital-to-analog converters inside most laserdisc players were designed for low cost, not high performance. Few of these built-in DACs can match the quality of today's high-end surround decoders, amplifiers, and loudspeakers. Consequently, you may not be getting all the sound the rest of your system can deliver.

System hierarchy

In the world of ultrahigh-quality music playback systems, it's a given that the quality of the *first* component in the chain has an inordinately large influence on the sound of the entire system. If the signal is of poor quality at the beginning of the reproduction chain, nothing that comes later in the signal path—preamps, power amplifiers, or loudspeakers—can make it better. Every component in the system must be able to reproduce the

sonic characteristics we value—bass power, dynamics, spaciousness, detail, and clarity, to name a few—for the system as a whole to reproduce those characteristics. If any component is lacking, the rest of the system will never realize its full potential. To put it another way: garbage in, garbage out.

Part of the art of assembling the best possible audio system for a given budget is understanding the relative importance of each component, a concept known as "system hierarchy." By matching the quality of each component, you can assemble a better-sounding system than if you spend the same amount of money on a less-carefully chosen package. Knowing how to allocate your budget is one of the secrets to getting topnotch sound.

For example, it's a common mistake to allocate too much of your budget to loudspeakers. After all, it's the speakers that actually produce the sound, according to common wisdom. But if the signal driving the speakers is hard, grainy, and lacking dynamics, the resultant sound will be hard, grainy, and lacking dynamics, no matter how good your speakers may be. In fact, pairing high-resolution loudspeakers with poor-quality electronics can produce worse sound than lesser speakers in the same system. The high quality of the speakers actually

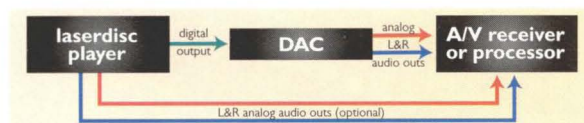


FIG. 1: The DAC connects between the laserdisc player and A/V receiver or processor.

works *against* good sound because they reveal all the flaws of the electronics driving them.

In the course of my work for *SGHT's* sibling publication, *Stereophile*, I often have the opportunity to listen to bizarre component combinations. For example, I've driven a \$200 pair of speakers with \$60,000 worth of electronics and put a \$300 CD player at the front of a \$70,000 reference-quality system. I can attest that source components—a laserdisc player, for example—play a crucial role in achieving good sound.

Simple fix, big benefits

If you've invested in a high-end surround processor, a top-notch multi-channel power amplifier, and a killer speaker system, the last thing you want at the very front of the system—supplying the *entire* signal—is the cheap and dirty digital-to-analog converter built into your laserdisc player.

Many home-theater enthusiasts are rapidly discovering the solution. They are bypassing the DACs inside their laserdisc player in favor of a high-performance, outboard digital-to-analog converter. This is easy to do: simply connect the digital output from your laserdisc player to the digital input of an outboard converter using the appropriate digital interface cable (see

The last thing you want is the cheap and dirty digital-to-analog converter built into your laserdisc player.



sidebar, "Making the Digital Connection"). The converter's analog outputs then feed your processor or receiver.

Fig. 1 shows how an outboard converter fits into your system.

The sonic benefits of adding an outboard DAC vary. The lower the quality of the converters in your laserdisc player, and the better the sound of the outboard converter, the greater the sonic improvement. However, I've found that even the least expensive outboard converters sound better than those built into most laserdisc players.

This is what I hear when I add a moderately priced outboard DAC to my home-theater system: a smoother and less grainy treble, wider dynamic range, deeper bass extension, more power and weight in the bass, a wider and deeper soundstage, more detail and resolution, and greater clarity. Better-quality converters also have a sense of ease, resolution, and refinement lacking in the converters built into most laserdisc players.

When to say when

Adding an outboard DAC isn't necessary for all systems. Some of the newer (and better quality) home-theater decoder/preamplifiers accept a digital input directly from your laserdisc player's digital output jack. These preamplifiers



Digital-audio data is transmitted from a source component (e.g., a laserdisc player) to an outboard converter through an interface known as S/PDIF (Sony/Philips Digital Interface Format). The interface carries the binary 1s and 0s that represent the audio signal, and appears at the jack marked "Digital Out" on your laserdisc player.

The two primary types of interfaces are *electrical* and *optical*. In an electrical digital interface, electrons carry the signal along a copper or silver wire. An optical interface transmits light along a plastic or glass fiber. Note that both types of interfaces carry the same signal, but in different ways and with different cables.

The most common electrical interface is called *coaxial*, which uses the familiar RCA connectors. If a digital

MAKING THE DIGITAL CONNECTION

source component has an electrical digital output, it is most likely on an RCA jack.

The other common electrical interface is called AES/EBU, named after the Audio Engineering Society and European Broadcast Union.

AES/EBU is carried on a balanced (three conductor) cable terminated with an XLR connector. The balanced cable and higher signal voltage of AES/EBU (5V compared with coaxial's 0.5V) confers some technical advantages. AES/EBU is found on high-end CD transports, but is rarely included on laserdisc players.

Nearly all laserdisc players, CD transports, and other digital sources include a TosLink optical output. TosLink is the low-cost optical interface promoted by mass-market manufacturers as a replacement for coaxial digital output. TosLink,

which is a trademarked name of the Toshiba Corporation, is more properly called "EIAJ Optical" after the Electronics Industries Association of Japan.

The major electronics companies had two good reasons for trying to convert the world to TosLink. First, TosLink jacks and cables are cheaper than their coaxial counterparts. Second, TosLink makes it easier for the components to meet FCC requirements for radiated noise. An electrical signal traveling along a copper wire (such as the S/PDIF signal in a coaxial interconnect) radiates radio frequency (RF) noise that could interfere with radio or television transmission. The FCC will summarily ban products that don't meet its criteria for radiated noise. Because TosLink sends the signal as pulses of light in a glass or plastic fiber, it produces no radiated noise.

A better-quality optical interface is called *ST-Type Optical*. Invented by AT&T for telecommunications, ST transmits light along a glass fiber instead of TosLink's plastic light path. (Some higher-quality TosLink cables also use glass.) ST's locking bayonet connector assures a good junction between the cable and optical transmitter and receiver. Laserdisc players are seldom fitted with an ST optical output due to its expense (ST can add between \$200 and \$400 to a product's cost)

Jitterbugs

The interface type and cable design can influence sound quality because the inter-



perform Dolby Pro Logic decoding in the digital domain, then convert the decoded signal to analog using their own built-in DACs.

This method has several advantages. First, the digital-to-analog converter in the preamplifier/decoder is probably of better quality than the DAC in your laserdisc player. Second, this connection totally bypasses an entire digital-to-analog and analog-to-digital conversion stages for purer sound. (The preamplifier's Dolby decoding circuits operate directly on the digital signal coming from the laserdisc player, which means the laserdisc player's digital output need not be converted to analog, then back into digital in the preamplifier for Dolby processing.) Getting these two conversion stages out of the signal path results in better sound quality.

Finally, an outboard DAC is of no use if you're running Dolby's new AC-3 discrete digital surround format. AC-3 operates entirely in the digital domain, so there's no need to

convert your laserdisc's digital output to analog first. Besides, the 5.1-channel AC-3 digital output isn't compatible with the 2-channel format used by outboard digital-to-analog converters. High-quality AC-3 decoders have their own 6-channel DACs built-in.

Try it—you'll like it!

The best way to find out if an outboard DAC makes a significant improvement in *your* system is to try one. Many dealers will let you take one home overnight on a trial basis. If the DAC makes an improvement commensurate with its price, buy it. If not, at least you've satisfied yourself that your laserdisc player's digital-to-analog converter isn't the weak link in your system's signal chain. However, I suspect that once you hear your system's full potential, you'll consider an outboard digital-to-analog converter an essential part of a good home theater.

SGHT

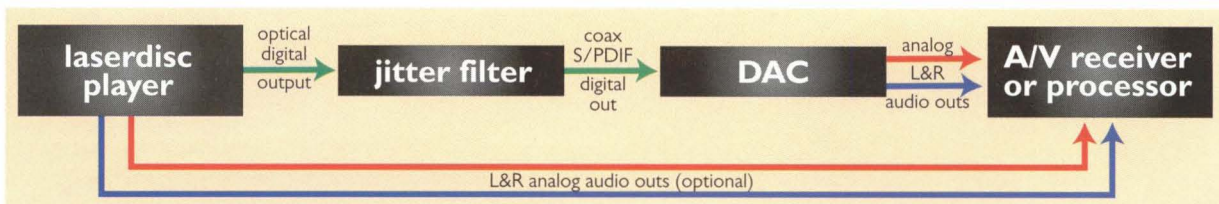


FIG 2: A jitter filter connects the LDP and DAC.

face affects the timing of the binary 1s and 0s that represent the audio signal. The timing errors introduced by the digital interface, which are called "jitter," create distortion and noise in the final analog output signal. Jitter makes the bass softer and less well defined, reduces dynamic contrast, adds a hardness to the sound, and decreases the size of the soundstage.

TosLink is by far the worst interface in all major respects: mechanically (the physical connection between the cable and jack is poor, and the cable itself is fragile), operationally (it has the lowest bandwidth and highest jitter), and sonically. The only advantage to TosLink is that it breaks the electrical connection between the laserdisc player and outboard DAC. Sonically degrading high-frequency noise on the laserdisc player's ground can contaminate the outboard converter's ground through an electrical connection. Because an optical interface transmits the signal without an electrical connection, there is no chance of coupling ground noise between components. However, the isolation advantage of optical connection doesn't make up for TosLink's fundamental inferiority.

If your laserdisc player has both coaxial and TosLink outputs, use the coaxial connection; it will sound significantly better than TosLink. If your laserdisc player has

only a TosLink output, you can add a unit called a *jitter filter* that reduces jitter and converts a TosLink optical signal to a coaxial electrical signal (see **Fig. 2**). Adding a jitter filter can greatly improve the sound of your home-theater system.

Note that a conventional RCA-terminated audio interconnect cable probably won't provide the best sound in a digital application; it was designed to carry analog audio, not high-speed digital pulses. In addition, audio cables typically have an electrical impedance of around 50 ohms (Ω); digital interconnects should be 75 Ω . Many manufacturers make specially designed "digital interconnects." If you can't afford one of these specialty cables, the next best choice is a 75 Ω , RCA-terminated video cable available at all RadioShack stores for about \$5.

When connecting a digital source such as a laserdisc player to an outboard converter with an electrical digital interconnect, be sure you



don't bundle the digital cable with the analog audio cables. The digital cable radiates noise that could pollute the analog audio signal. Keep analog and digital cables away from each other, and if they must meet, cross them at right angles.

Sidebar text and illustrations adapted from The Complete Guide to High-End Audio by Robert Harley. ©1994 by Robert Harley. Illustrations courtesy AudioQuest.



PSB CS

PSB Subsonic III

PSB Stratus Silver

Perreux MC6100

Mitsubishi HS-U760

PSB Stratus Mini

Citation 7.0

Pioneer Elite CLD-79

This
Recommended
System delivers
audio and
video
performance
that's out
of this world.

Stellar System

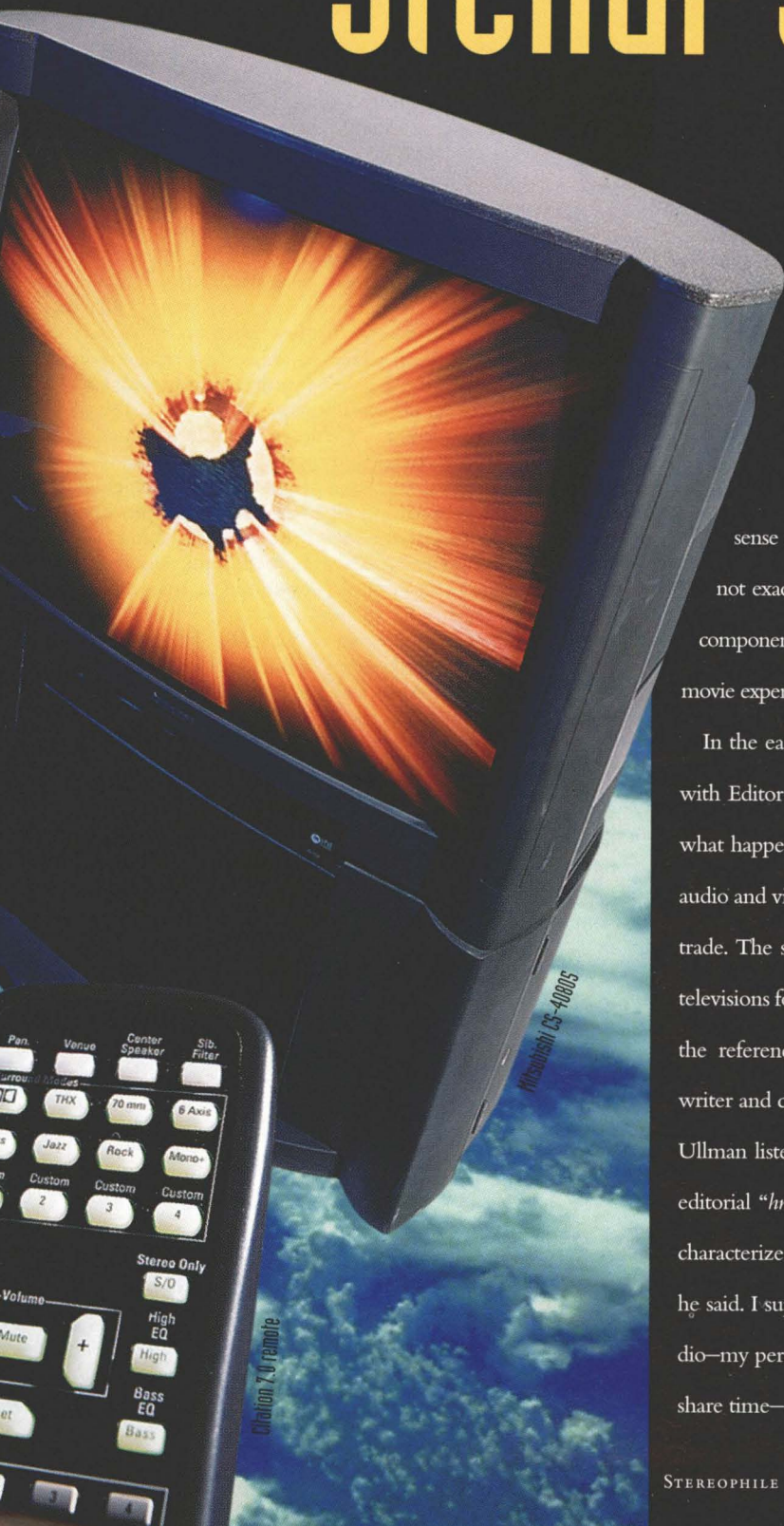
Lawrence B. Johnson

The home-theater system that takes you the farthest out of this world is the one that feels most like home. The components that send you into sensory free-fall are the ones that give you the surest and clearest

sense of orientation. What I am about to describe here is not exactly—that is, not merely—a scheme of recommended components. It is my spaceship. Let's just say it delivers a cosmic movie experience and tunes me in to the music of the spheres.

In the early stages of planning this article, in conversations with Editor Lawrence E. Ullman, I outlined for him exactly what happens in my studio and how I settled on the array of audio and video gear that serves as the basic tools of my critic's trade. The same system I use to evaluate both laserdiscs and televisions for the *Stereophile Guide to Home Theater* also serves as the reference setup for my work as consumer electronics writer and classical recordings critic for *The New York Times*.

Ullman listened to this account with an occasional, distinctly editorial “hmmmm,” then asked me to do more than list and characterize the parts of the puzzle. “Tell us how it evolved,” he said. I suppose the short version of that tale is that my studio—my personal place for music, where cinema is allowed to share time—evolved with me.



I've been writing about recordings for almost 30 years, and I've tracked movies on laserdisc for a decade. I greeted the emergence of home theater with a zeal that's still on the rise. And yet, like so many readers of *SGHT* and *Stereophile*, I have been frustrated by the failure of first-rate "home-theater" (usually meaning THX-certified) systems to deliver anything close to realistic playback of acoustic music. This dilemma, albeit hardly unique to my case, led me to limit THX-certified speakers to my larger theater room and establish a fundamentally musical sound as the benchmark of my multipurpose studio.

I come down squarely on the side of loudspeaker designer Jim Thiel and his contention that a speaker is a speaker, and that it certainly doesn't care what kind of information is fed to it. No matter whether it's Bruce Willis banging his way through another air shaft or the Vienna Philharmonic playing Mozart, a well-designed speaker shows its colors—or, shall we say, lack thereof. To be sure, the whole story of successful sound reproduction does not lie within the speakers; but it's equally true that speakers can be a limiting factor, and there is no room in my heart (or my studio) for speakers that make an opera sound as if it's being performed with the curtain down.

Just as I keep many professional irons in the fire, I maintain several listening venues in my home. And to greater or lesser degrees, they all continue through just the sort of evolution Ullman mentioned. Products come and products go, but some endure. Thus I could recommend several systems—say, one built around the Thiel CS-7 speakers (perhaps my all-time favorite design, though it's best suited to a large room), or one based on McIntosh's elegant twins: the C-39 processor and 7106 6-channel amp. But the most settled space is my studio. That's where Beethoven and Schwarzenegger hang out together. And the system there has not simply evolved; it has been honed.

Silver lining

Since I've already placed such importance on speaker selection, let's start there—with an array from PSB built around the floor-standing Stratus Silver. From the top of the line to the bottom, designer Paul Barton's speakers represent exceptional value and rare musicality. The Stratus Silver, a slim tower 39 inches high (\$1650/pair in gloss black), is a 2-way design that uses two 6½-inch midrange/bass drivers and a 1-inch metal-dome tweeter. With a 91 dB sensitivity rating, it is quite responsive to even modest receivers, yet it can handle a lot of power and play both loud and surprisingly deep without losing focus.

Deep, indeed. PSB says the Silver goes all the way down to 26 Hz, and I must say that would be quite enough bass to satisfy these ears. While I do keep subwoofers available (and I'll get to that momentarily), my long-standing orientation toward music—as opposed to



the big-bang artifice of cinema sound—has, well, *inoculated* me against the subwoofer virus. You are free to call it a prejudice. The Silvers are, in short, wonderfully musical loudspeakers with a well-tempered middle voice that gives way to a naturally rounded top end. And while a plain black oak version costs \$150 less, I prefer the patrician (perhaps Bösendorfer) beauty of the gloss black.

When the Silvers are matched with the model C5 center-channel speaker (\$499 in gloss black), you have an instantly embracing sound that might serve very well in a "Dolby 3" mode without surrounds until your bankroll was replenished. The family likeness between the sound of the Silvers and that of the

C5 is stunning.

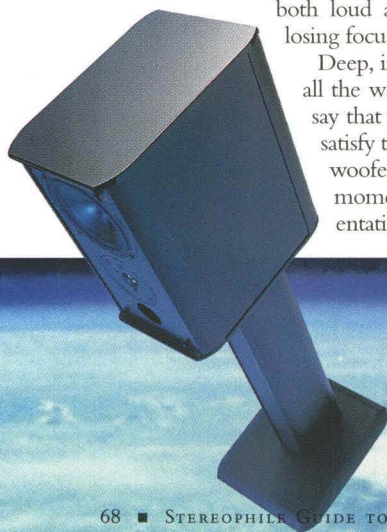
While much is made of the importance of timbre-matching, I've seldom found that concept to be so effectively practiced as Paul Barton has managed here. In the opening scene of *Patriot Games*, for example, when we first hear Harrison Ford's voice on his own answering machine at home, then—in the same conversation—switch to "live" half a world away, but with Ford off-screen to the left, then actually pan to him speaking, the C5 tracks the changing acoustics with eerie realism and in perfect flow with the towers to left and right.

Just as the C5 isn't cheap, it isn't diminutive, either. Measuring 20 inches wide by 10 inches deep by 7 inches high, it houses two 5¼-inch midrange/woofers that frame two stacked ½-inch tweeters. Rated at about the same sensitivity as the Silvers, the C5 also can play loud. And its bass response descends to a respectable 58 Hz.

The back end of this system is a pair of PSB Stratus Mini bookshelf speakers, which carry out the formidable resonance and presence of the Silvers and C5. I had used the curiously named Minis (\$1050/pair in gloss black, \$950 in standard black) as the main speakers in my studio for some time before thinking to convert them to surround service. The Minis aren't all that petite. They stand 17 inches high by 9 inches wide by 13 inches deep, and weigh 54 pounds each. Each unit contains one 6½-inch midbass driver and one ¾-inch tweeter. PSB sells 26-inch stands—to which the Minis can be bolted for maximum stability—at \$180/pair.

In one respect, these robust "little" speakers are a puzzle. While PSB declares their sensitivity to be a moderate 88 dB, my impression has always been that the Minis are exceptionally power-hungry. No medium-powered receiver can drive them effectively. But they do blossom when matched with a serious amplifier, as they are here. In my setup, the stand-mounted Minis are perched on a 24-inch pedestal so that their sound is dispersed well above the heads of seated listeners and outward from the listening area. With bass rated down to 34 Hz, these speakers round out a system that is well suited to the demands of discrete digital surround-sound.

That brings us to the matter of subwoofers, and I put that



in the plural because if you're going to use a subwoofer at all, it's essential to use two. You'd do as well to drive your car without the fourth wheel as to set up a home-theater system with a single subwoofer. I can live with none, but not with one. You need two subs to cover the soundstage properly—so that when the choppers sweep across the scene from left to right, their VROOOM doesn't fade to *vrooom*.

In the case of PSB's Subsonic III powered sub, that double investment comes to \$1800; but you get a sub smartly tailored to the sound of the rest of the system. The Subsonic III is a medium-sized cube housing a 12-inch woofer and a 180W amplifier. Along with a phase switch, it offers adjustable level and roll-off controls, and it's rated down to 24 Hz. Be confident this sub will deliver the full thud of a falling T-Rex foot.

Power play

The amplifier I use to drive this array is the Perreux MC6100 (\$3995), a 6-channel device rated at 130 watts per channel. I prefer it to every other multichannel amp I've heard for two reasons: 1) it seems virtually transparent in the system and, 2) although it can be bridged, any two unbridged channels of this amp can handle the most demanding speakers I've ever put in its path.

What can be added to this endorsement that most conventional reviews typically cannot offer is a certain confidence in long-haul performance: that is, durability. The Perreux gets a workout almost every day, and after many months of service, it's still purring. So, while it's no bargain-basement find, the MC6100 gives you what you pay for.

That's a recommendation. But there's also a splendid alternative that bears serious consideration: the Carver AV-806x, which at \$1795 costs less than half the price of the Perreux, yet delivers most of the performance. I don't especially like the cheap-plastic speaker connections on the Carver, but I do like the vibrant sound of the amp, and I've used it extensively.

Core components

From the day I set up the Citation Model 7.0 preamp/processor for review some months back, it has remained a core component of my studio system. By now, I've heard most (assuredly not all) of the surround processors out there, and the Citation (\$3950) is my favorite for a number of reasons. It's the most musical processor I've encountered, it's extremely precise in its Dolby Pro Logic tracking, and it's a breeze to use.

Although J. Gordon Holt complained about the processor's ergonomic design in his review of the complete Citation system (*SGHT* Summer 1996, Vol. 2 No. 2),

I find its operation to be quite intuitive. I confess I'm a reluctant reader of owner's manuals, and yet I mastered the Citation 7.0 with very little head-scratching. The remote is logically laid out and the processor's elegant front-panel display can be switched off so as not to distract from the cinematic experience.

The Citation currently doesn't offer Dolby Digital decoding; that must wait for the Citation 7.5DP Digital Processor (\$N/A). But that's okay: Dolby Digital is still a fringe factor, and I see no particular need to rush into an upgrade. At this point, I'm still not entirely convinced of its superiority over conventional matrixed Dolby Surround.

Thus we come to the laserdisc player. Until the digital video disc (DVD) blasts into spectacular reality, the laserdisc will remain my cinema medium of choice. While I appreciate the high quality of the Digital Satellite System (DSS), on a properly setup television, no other source can match the look of a good laserdisc. I have long used the Pioneer Elite CLD-97 as my reference LD player. As I was preparing this report, however, Pioneer's new CLD-79 (\$1440) showed up on my doorstep and quickly revealed some winning qualities—all of which Thomas J. Norton spells out in detail in his review elsewhere in this issue.

The price, little more than half that of the now-discontinued CLD-97, is attractive for such a well-designed component. And with the digital video disc hovering in the wings, it's hard to recommend spending really big bucks for a laserdisc player. Pop the \$1440 for the CLD-79 and sink the difference into lots of wonderful movies.

I can be brief about a VCR. I almost never use one. I rarely watch network television—except for the odd movie, the occasional war on CNN, and every National Football League game I can squeeze in—so time-shifting holds no interest for me. And I don't rent tapes because I can't tolerate their pizza-like appearance on a big screen.

However, I *do* like the construction of Mitsubishi VCRs in general, and might suggest the HS-U760 (\$799) as a reliable S-VHS model. Why an S-deck? If you're going to have a VCR at all, it might as well be one capable of doing justice to laserdiscs and DSS broadcasts. In addition, the 760 is packed with useful features such as DSS control and VCR Plus+ with cable-box control. Besides, in the context of this system, the extra cost compared with a high-quality, standard VHS Hi-Fi deck is negligible.

Finally, the video monitor itself. I freely admit to falling hard for the Mitsubishi CS-40805 (\$3999), the 40-inch direct-view model I reviewed in our last issue. It wasn't love at first sight; I wasn't really smitten until a masked minion of the Imaging Science Foundation had worked over the set and turned a pretty good picture into an image to die for. I have since died a thousand deaths. The corrected picture has a three-dimensional quality that can make you feel you're enfolded not just in the sound but in the image itself. Color and detail measure up to the best I've seen.

I always have bigger televisions sitting around the house. But I gravitate toward the 40-inch Mitsubishi. It's the new star of my studio. **SGHT**



FREQUENTLY ASKED QUESTIONS

THOMAS J. NORTON, LAWRENCE B. JOHNSON, RUSS HERSCHELMANN

Q *I've heard of Dolby AC-3. Lately I've been hearing about Dolby Digital. Is this something new, and if so, what gives?*

A When Dolby Laboratories first introduced their 5.1-channel, discrete digital surround-sound system in commercial theaters, they dubbed it Dolby Stereo Digital. The AC-3 moniker actually refers to the digital encoding/decoding process or "algorithm" that squeezes 5.1 channels down to a size practical for film, laserdisc, DVD, HDTV, etc., and not to the format itself. Although Dolby never intended for it to be used in this way, it didn't take long for press and public alike to begin referring to the new digital surround format as "AC-3."

I know of no one who is unhappy with this name, but obviously for Dolby it leaves something unsaid—specifically, the name Dolby. So they have elected to officially decree that the system shall, henceforth, be known as Dolby Digital, with the appendage AC-3 cast into the outer darkness (except when referring to the actual coding algorithm, of course).

We have no problem with this, though for a few issues you can expect the term AC-3 to be used interchangeably with Dolby Digital, to keep matters clear and avoid reader confusion. Dolby is also suggesting that, during this "transition period," the format be called "Dolby Digital (AC-3)." You'll also see this terminology used in *SGHT*, at least for the time being.

However, the new name carries the potential for confusion with the Dolby Surround-encoded digital tracks on a conventional laserdisc. Yes, these are Dolby, and yes, they are digital. But they are *not* Dolby Digital; they convey matrixed Dolby Surround information, and are typically played back through a Dolby Pro Logic decoder. In my opinion, the term AC-3, while it lacked a certain flair (and didn't flash the Dolby name), at least did not add to possible confusion with existing, matrixed surround formats.

—TJN

Q *I'm seeing more and more products advertised as "AC-3 ready." What does this mean?*

A This is a fresh variation on an old theme. When the CD was first introduced, amplifiers and, in particular, loudspeakers, were advertised as "digital ready." It wouldn't surprise me if the introduction of the vinyl long-playing record brought about a rash of "LP-ready" products.

However, with respect to AC-3, or now more correctly, Dolby Digital, the term has more than a grain of significance. The most important consideration for "Dolby Digital-ready" status is the ability of the surround processor or receiver to decode Dolby Digital, or accept an outboard adapter to do so in the future. Some devices can be upgraded internally with the addition of a plug-in AC-3 card; others accommodate an outboard processor via a discrete-digital input (sometimes using a DB-25 computer-type connector) or pre-out/main-in connectors for all channels.

To play back current laserdisc-based Dolby Digital (AC-3) material, you need a laserdisc player with an AC-3 RF output. The RF-modulated AC-3 datastream is fed to an AC-3 RF input on the surround processor, where a demodulator strips off the AC-3 digital datastream prior to decoding it. (In some

equipment, such as the Meridian processor reviewed in this issue, the demodulator is a separate box.) In addition, if you want to be able to handle Dolby Digital from upcoming formats such as DVD, your receiver or processor must also accept an *unmodulated* AC-3 digital datastream, which will be conveyed via a TosLink or coaxial digital connection. (There is no RF modulation on the output from a DVD.)

There is no real difference between a loudspeaker suitable for conventional Dolby Pro Logic and Dolby Digital. (I omit for the sake of brevity the controversy of dipole *vs.* conventional surrounds—a topic we have touched on before in *SGHT* and certainly will again.) The single exception to the loudspeaker question is with subwoofers; a small, minimally effective subwoofer just will not do for Dolby Digital. The more robust and capable the subwoofer, the better.

As for amplification, I would avoid very low power designs, unless your loudspeakers are unusually sensitive. As with Pro Logic, the more power, the better—up to a point. For me, that point lies at about 125 Wpc but again, the sensitivity of the loudspeakers, the size of the room, and the sound levels you wish to attain are all factors to consider.

—TJN

Q *Is there a rule of thumb about the relationship between room size and screen size?*

A Like Goldilocks, you're going to want a home-theater screen that's not too big, not too small, but just right. If you're more conscious of scan lines than any other feature of the picture, the television is too big for your room. To put it another way, if you can't back away to a viewing distance from which you can perceive images rather than the *elements* of images, you're looking at too much of a good thing.

Most of the screen-size "rules-of-thumb" floating around out there are intended for professional production environments, not for home viewing. One exception is that of the Custom Electronic Design and Installation Association (CEDIA), whose Home Entertainment Council recommends that a screen cover a 22.5° horizontal field of view. You can drag out your slide rule and high school geometry textbook, but 22.5° translates to a screen diagonal that is roughly one-half the seating distance.

Example: For a seating distance of 10 feet, you'd want to divide 10 by 2 to get a 5-foot, or 60-inch, diagonal TV screen.

Please note that CEDIA's formula works for standard (4:3) aspect-ratio TVs only. If you have a widescreen TV or a projector with aspect-ratio conversion, you're going to need to work with a competent theater designer to determine optimum screen size.

The Imaging Science Foundation (ISF) also has a handy guideline: If you're lucky enough to have a high-end video-projection system with a video processor such as a line doubler or quadrupler, you can sit as close as 1.5 times screen width—provided your projector is dialed in perfectly and your installer is a trained technician with the necessary goodies.

Finally, here's a very practical tip: In your viewing room, measure the distance from the designated screen location to the primary seating. Take your measuring tape shopping with

you and test that viewing distance in the store. The screen size that proves "workable" in the showroom—that is, gives you a sense of involvement and doesn't cause scan lines to pop out—will be just as successful at home.

—RH and LBJ

I want to put in a serious home-theater system, but I don't want any of the equipment to show (except for the screen, when in use). I've seen a lot of beautiful installations in the glossy magazines that have all the speakers hidden from view in cabinetry or mounted in the wall. Can I do this and still get good sound?

Although installations involving hidden loudspeakers—either in cabinets or in the walls—can be surprisingly effective, you should be aware that there are serious compromises involved in such an arrangement. The best sound still comes from loudspeakers installed in cabinets specifically designed for them by the manufacturer. Furthermore, only a few loudspeakers are designed to be positioned up against a wall, and none that I know of are really designed to be put on or in a bookshelf or other piece of furniture, though the term "bookshelf" loudspeaker has somehow become ingrained in our vocabulary.

To perform at their best, nearly all loudspeakers should be freestanding, and clear of adjoining walls or large pieces of furniture—the farther away, the better. The tweeters of most loudspeakers sound best when located approximately at ear-height. With smaller loudspeakers, this means placing them on a stand of reasonable quality. The center loudspeaker is usually placed on top of a one-piece television or under the screen with a two-piece video projector (either placement is also a compromise, but an unavoidable one). Surround speakers are often at their best when mounted high on the sides of the room.

Regular readers of *Stereophile* are aware of the placement requirements of stereo loudspeakers for the best performance; home-theater requirements are no different. But often even audiophiles must compromise for practical reasons, unless they have a totally dedicated listening room. If you *must* have hidden loudspeakers, a talented designer can make them work—sometimes astonishingly well. If you are unfamiliar with what modern loudspeakers can do at their best, you will probably sense nothing amiss and may well be delighted with the resulting installation.

By no means should requirements for less-than-perfect loudspeaker positioning discourage you from acquiring a good home-theater system. Just be aware that neither money nor talent (nor equalization) can completely compensate for a less-than-ideal loudspeaker setup.

—TJN

I really prefer the sharp image of a direct-view TV over any rear-projection TV (PTV) I've seen. Why don't manufacturers—particularly Mitsubishi, which makes a 40-inch direct-view set—bring that technology to a 45- or 50-inch direct-view?

Can you say *implode*? A 40-inch CRT is monstrously heavy, difficult to manufacture, and even harder to stabilize for long-distance shipping. Beyond 40 inches, direct-view tubes are said to have a strong tendency to collapse under their own weight.

**DVD is
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Although bigger tubes can be manufactured, they apparently would be extremely impractical and dreadfully expensive. The 40-inch Mitsubishi CS-40805 (see my "Recommended System" elsewhere in this issue) carries a suggested retail price of \$4000. That's approaching the cost of a 60-inch rear-projection TV, and you can bet a still-larger tube would cost much more. At that point, most people probably would opt for a giant-screen rear-projection set.

Besides, much as I love the Mitsubishi 40-inch, I really don't want a 45-inch direct-view set showing up on my doorstep. I wouldn't wish that on the two guys who help me wrestle televisions out of their boxes and lift them onto groaning tables. But I have raised the question of larger direct-view

sets with Mitsubishi, and the answer might be freely paraphrased as, "Don't ask."

—LBJ

I've heard favorable things about the new DVDs soon due on the market. News articles are touting them as superior to laserdiscs. Are they?

We don't know, and the writers of most of the articles you speak of don't know either—yet. Pundits who have observed controlled demonstrations of the format at trade shows have expressed strong opinions one way or the other, but if you pin them down, they will admit that such demonstrations do not necessarily indicate how the format will perform when genuine production hardware and software appear in late summer or early fall.

And even then, we may not know immediately. There is tremendous pressure on both hardware and software manufacturers to get DVD onto the market in time for the big pre-holiday shopping season—the make-or-break sales period for most retailers. Some of the promised 250 to 300 DVD titles may well be rushed. Also, rarely does a new technology perform at its best right out of the starting gate.

DVD is an exciting development, but most of the talk to date about its performance is just that—talk. Computer on-line services and World Wide Web sites are awash with hypothetical critiques of DVD; much of the criticism comes from consumers who haven't even *seen* the system but anticipate the worst.

The worst-case scenario would be that, despite being inferior to laserdisc, DVD is a marketing success and soon kills off the superior format. That is indeed a genuine fear. But the best-case scenario would be that DVD will prove to be as good as or better than laserdisc. In actuality, I expect DVD to be better than laserdisc in some ways, inferior in others. Hopefully, its inevitable shortcomings will prove minor and easily correctable.

—TJN

SGHT

If you would like to submit a question for consideration in this column, please write or fax to:
"FAQ Column," *Stereophile Guide to Home Theater*,
208 Delgado, Santa Fe, NM 87501; fax 505-983-6327.



Shopping for an A/V receiver? Here are a few features that make beautiful music, and some bells and whistles that are little more than marketing noise.

The receiver has always been a remarkable package, as convenient as it is complex. Today, as the nerve center of a home-theater system, the audio/video receiver represents a more amazing technological achievement—and a greater boon—than ever before. But as friendly as the new A/V receivers may be, they can be rather daunting to approach on the store shelf, and harder than ever to tell apart.

For all their priceless practicality, A/V receivers confront the innocent shopper with more digital bells, multichannel whistles, and on-screen gizmos than have ever been

crammed into a single electronic box. But fear not. Good sense can still be separated from nonsense in an electronics store. With a little forethought, you can wade into the receiver morass and come away with a good investment that will pay dividends for years to come.

As with any other component, the critical issue is *performance*. Yet, when Model A sounds an awful lot like Model B, it may be features that decide the issue. Some amenities matter; others don't. And some really slick strokes of engineering can turn out to be more of an obstacle than a help. With a little perspective, you can home in on the theater center of your dreams.

By Lawrence B. Johnson

Features that matter

Power output: Around these precincts, we've generally agreed on 70 watts per channel (Wpc) across the front three channels (see the next item) as a practical minimum. But I have reviewed receivers rated as low as 50 watts across the front that served a modest home-theater system set up in a medium-sized room. Much depends on the design of the amplifier, especially its power supply. And note the exact context of the power rating. It should be specified as so many watts into an 8-ohm load from 20 to 20,000 Hz with a total harmonic distortion factor (THD) that shouldn't go much higher than 0.1 percent. Pay special attention to the center-channel power spec: It is often given in the more forgiving context of 1000 Hz.

But there are other considerations, too: How grand and power-hungry are your main loudspeakers? How loud do you like to play movie soundtracks? How large is the room? Don't be overly concerned about erring at the upper end; you can't have too much power. As for rear-channel power, don't expect to find more than 20 to 25 Wpc in most receivers. But remember that in Dolby Pro Logic the rear "channels" are actually delivering a mono signal, so that smallish power rating is effectively doubled.

Equal power across the front: That's the industry mantra, and everywhere you look, audio writers endorse the notion. Moreover, almost any receiver from the entry level up delivers power rated (however casually) as equal across the front channels. I don't know whether that evenness of means appeals more to an ingrained preference for symmetry or to the American spirit of equality. But in practical terms, the mantra is suspect.

When the early designers of multichannel receivers provided 110 watts right and left, with 60 in the center, they weren't trying to short-change anybody; they were thinking logically. Indeed, that logical reference point is plastered on the front panel of your Dolby Pro Logic receiver—where you find the center-channel options of Wide and Normal.

Let's take Normal first. Normal here means typical, which means the center-channel speaker is a half-pint dialog conduit that you'd never dream of using strictly for music. It probably has a passable treble range but no real bass response

below 100 Hz or so. Given that reality, the Normal center-channel setting causes deep bass to be rolled off to the center channel and directed to the main left and right speakers, which presumably are capable of handling deep bass. And it's the reproduction of deep bass that demands the lion's share of amplifier power. Of course, if all three of your front speakers are identical, meaning you select the Wide center mode, the center speaker sees a full-range signal and that full share of power becomes appropriate.

Surround-sound modes: Here is marketing hype at its most egregious. When I review a home-theater receiver, I look for exactly the same things I looked for in a good two-channel stereo model,

Anyone who has tried to balance a multichannel home-theater loudspeaker array knows the importance of having level adjustments on the remote.

and they can be summarized in a single word: *performance*. When the first receivers appeared with digital signal processing (DSP), I was curious and experimented with it for a time. Now I simply don't care. A feature that matters? A feature that will help you determine which receiver to spring for? DSP? I don't think so.

What we have here are bells and whistles transmogrified into 1s and 0s. After you've shown your neighbor and brother-in-law all the cool DSP modes that scroll across the display field, and maybe try one or two, you'll go back to listening to movies in Dolby Pro Logic and music in 2-channel stereo. OK, maybe you'll use Pro Logic for music, too, or a matrix surround mode labeled Hall. Anyway, who would want to distort the sound of a recording by tacking on a phony recreation of a cathedral or a jazz club on top of the ambience already contained on the disc? Yikes! If speakers could talk, they would scream for a return to musical truth.

Audio/video inputs: Probably the most important aspect of this subject is simply having enough inputs to handle all the source components you have now, or expect to have in the near future. If you're planning on a full-blown home-theater system, you'll need audio/video inputs for a DSS receiver, laserdisc player, at least one VCR (better still, two), and a digital video disc player. You'll also want audio-

only inputs for a CD player, at least one audio tape deck, and the audio output from your TV. (The latter input allows you to monitor the TV-tuner's output through your system, which comes in handy when you want to watch one program in real-time on the telly while recording another program on a VCR).

With so many A/V source components on tap, it's helpful to see clear labeling of inputs on the front panel. Although all such sources—really any component except a phonograph—can be connected interchangeably, having designated inputs (e.g., VCR, TV, LDP) adds a needed measure of clarity to the complex issues of home theater and a multichannel receiver.

There's also a consensus here at *SGHT*

that each input should have its own dedicated access button on the front panel, and—even more important—on the remote. This is opposed to the "scrolling" method, in which you must repeatedly press, say,

a Video button until a sequence of read-outs finally gets around to VCR or LD.

Subwoofer output: A subwoofer output (sometimes labeled "mono output"), allows you to link the processor in your receiver directly to the line-level input(s) on a powered subwoofer. Lacking such an output, you'll have to muck around with old-style high-level speaker wiring, running one set from the receiver's speaker terminals into the sub, and another set from the sub to the main front speakers.

Pre-out/main-in: The first half of this category refers to connections that allow you to bypass the receiver's internal amplifier—or parts of it—and use a more powerful outboard amp. Let's say you want to go for more power to the front left and right speakers. You buy the stereo muscle amp of your choice and, using standard (preferably high-grade) interconnects, you connect the pre-out jacks marked Front Left and Front Right to the appropriate inputs on the new amp. Now that section of the receiver amplifier is out of service. The main-in is used when you want to connect an external preamp or processor to your receiver, implicitly bypassing those functions of the receiver.

Typically, I would say the latter course is highly unlikely. And for that matter, I doubt the likelihood of your ever using the pre-outs to hook up an auxiliary amp

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"I see the piece as a whole," says Silverman. "When I'm starting to play it, I'm standing on my tiptoes so that I can see over

the horizon to the end." According to some critics, the piece represents the Faust legend—see if you don't hear suggestions of Mephistopheles in the later passagework.

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with your receiver. More likely, one of two things will happen: You'll buy a new, grander, more versatile receiver (perhaps with AC-3 circuitry), or you'll step up to separate components. Pre-outs are a cool selling tool. "If you ever decide to upgrade your system, you can go to more power without sacrificing your receiver investment." Right. I'd like to know how many people ever actually do that.

Motorized volume control: A classic rotary volume control is a *potentiometer* or "pot"—basically, a resistor that's value changes as it is rotated. By driving this with a motor controlled by the remote, you can alter the volume level. But there is a more common means of changing the volume, by linking the remote sensor to internal electronic circuitry that alters the volume without any mechanical action. High-end audio manufacturers have long avoided the latter because they felt the required circuitry was sonically suspect, while potentiometers were a well-understood, reliable technology.

Today both methods are used. Many high-end separate surround processors employ electronic control, and yet potentiometers can be found on a variety of high-end stereo preamps. You'll find motorized pots on some receivers, electronic volume control on others. In fact, some receivers use a combination of the two techniques: a pot for overall gain and electronic control for individual channel levels. While electronic control offers the ergonomic advantage of digital display of the volume setting, what counts is the component's overall fundamental sound quality. An intriguing method of volume control should not be more important than that.

Remote control, part I—surround and center level controls: Anyone who has tried to balance a multichannel home-theater loudspeaker array knows the importance of having level adjustments on the remote. If you plan to be sitting over here to watch movies, you can't very well contour the sound while standing over there by the receiver. True, you can collar an assistant (long-suffering spouse, petulant child) to call out "That's pretty good" while you punch the buttons on the front panel. Then you dash over to the sofa for a quick listen, conclude that the setup is far from pretty good, dash back to the receiver.... There's

a better way, and remote control of surround and center volume levels is it.

Remote control, part II—learning and light: This is not a digression into spirituality and the higher values of home theater, but rather a notation of the huge advantage that comes with a universal (or "learning") remote control. All other aspects of two receivers being equal, this well may be the clincher. As a reviewer, I live amid a confetti of remote controllers. Until all my little remote ducklings are in a row, I can't even turn on the system and



watch a movie. But components come and go so fast it's hardly worth the trouble to program all the needed stuff into a single device. Were I a carefree consumer, however, I most definitely would pack all those commands into one little magic wand. I watched my son-in-law do his whole system one afternoon. Actually, the whole process was completed in about 30 minutes. Ah, to be a carefree consumer.

Speaker terminals: To bind or to clip, that is the question. Not to beat around the 5-way post, the answer is to bind. While most better-quality receivers provide decent screw-down receptacles for one or more sets of stereo speakers, connectors for the surround and center speaker wires tend to be cheap little spring-loaded clips. The nutty aspect of this is that, in many setups, the run to the rear speakers is much longer than the distance to the main stereo pair; thus heavier-gauge wire is desirable—but the crummy little terminals on the receiver won't accept large-diameter wire. Believe me, I know. I've reviewed some otherwise splendid receivers that confronted me with those miserable spring connectors for the surround and center wiring. I assume it's holding down man-

ufacturing costs, but it is dumb, dumb, dumb. And vexing.

Frills you can live without

Station presets: Here's a biggie. It surely would warm the cockles of my heart (whatever those are) to know I could set up my tuner to snap in any of 32 stations at the touch of a button. We need a jolt of reality here. I live in a sizable metropolitan area, and while I have not made the attempt, I doubt I could bring in 32 stations, AM and FM combined. The tuner in my car lets me preset six stations and I only use three. More than that, and I forget which number is which station. Let's say you have a memory like a steel trap; you might make use of a dozen presets. But 24 memorized stations, or 32? Yet why stop there? This is the digital age. One little chip could store 64 stations, maybe 128. Which in my case would leave 125 for my wife, children, and the swarming neighbors.

Onscreen graphics:

Where receivers are concerned, this is the most oversold "amenity" of the last five years. You *need* onscreen graphics for one thing only, to make adjustments in something that's happening on a screen. Beyond that, the technoculture of onscreen graphics is largely a testament to the magnetic power of visual phenomena. But then that sums up television as a whole, doesn't it? I have reviewed receivers that were all but unusable until I turned on my television set, thus availing myself of the *Graphical User Interface*, or GUI. The acronym is pronounced just the way it looks, which allows me to say that I regard the whole business as a big GUI mess. Just because some overzealous engineer slipped his leash, and a desperate marketing maven seized upon that indiscretion as the sliced bread of the '90s, I should not have to turn on my television to listen to my CD player.

S-video inputs/outputs: Don't overrate the value of these. Unless you have an S-VHS VCR, you're just as well off using conventional, RCA-plug-terminated, composite-video connections. Even if you *do* have an S-VHS deck, bypassing the receiver and running the S-cable directly from the source-component's output to the TV's S-video input will result in a shorter cable run—always a good idea when dealing with S-video connections.

SGHT

MITSUBISHI VS-6085

REAR-PROJECTION TELEVISION

Thomas J. Norton

The VS-6085 is Mitsubishi's top-of-the-line 60-inch, rear-projection television, although you will not find it in the standard Mitsubishi lineup at all. It is the largest set in their Diamond Line, sold by a limited number of Mitsubishi dealers. As with Pioneer's Elite series or Sony's XBR line, Diamond products are intended to be prestige, flagship models.

After June 1996, however, you may or may not find this specific set in your local dealer's stock, even if that dealer carries the Diamond Line. As this review was wrapping up, Mitsubishi announced that the VS-6085 would be replaced by the VS-6087 in June. But that's okay: The new set is a carryover in every respect save for the model number.

Where's the slot for toast?

Like all top-rung televisions these days, the VS-6085 has so many features that consumer training sessions might be

the next retail-video growth area. Today, Windows 95; tomorrow, cutting-edge televisions. Mitsubishi does its best to simplify a complex situation with three-count 'em—three separate manuals: the Owner's Guide, the Installation and Set-

up Guide, and the StarSight Operating Guide. Mitsubishi's manuals are some of the best around, but this set is clearly not aimed at consumers who still have 12:00 flashing on their VCR.

Installation and setup are no more complicated than any other television. The Installation and Setup Guide thoroughly describes the most common options. Antenna, composite, and S-video inputs are provided, along with connections for cable box control. There are also connections for Mitsubishi's A/V Network, which interlinks the VS-6085 with other Mitsubishi components to simplify operation.

Once everything is connected, setup involves simply following the direc-

tions in Mitsubishi's ViewPoint III multi-layered, onscreen menus. Invoking the menus also calls up a picture-in-picture (PIP) window with the current program. At first, this seemed of little practical benefit, but it did prove occasionally useful—for instance, when deciding which channels to add/delete after performing the initial setup.

The ViewPoint menus themselves won't dazzle you with onscreen graphics, but they are clear and perform their intended function without fuss. There is also a user-selectable "advanced menu," which is similar to the standard menu but has only simple icons for the first layer with no written descriptions. Until you learn what each icon means, the advanced menu is not straightforward. The standard menu was more user-friendly, at least initially.

The VS-6085 also has 2-tuner PIP, which can perform the usual tricks, such as moving the PIP window around and freezing the image. It also offers a few interesting but marginally useful tricks, such as memorizing and displaying several still PIP images (or one moving and several frozen ones) simultaneously.

One nice touch is the lack of any border around the PIP image; a bright white border can cause permanent image "burn-in" if left on the screen for an extended period. (Our local cable service carries one station that uses a fixed border around two sides of the screen all the time to provide programming information. I will not watch this station for that reason.)

Furthermore, unlike many sets in which the PIP contrast is set at a level that is too high, the Mitsubishi's PIP image tracks the user's contrast setting for the main image. The same thing applies to the menus, which don't floodlight the entire room when you call them up.

Other useful features on the VS-6085 include: three color-temperature settings; Quick View (QV), which provides instant return to a specific, memorized station (for channel-surfing during commercials, perhaps?); Super Quick View (SQV), which cycles through up

Mitsubishi VS-6085

rear projection television
Screen diagonal: 60"
Dimensions: 59.7" x 49.4" x
28.7" (HxWxD)
Weight: 286 lbs.
Price: \$4699

Manufacturer:
Mitsubishi Consumer
Electronics America, Inc.
6100 Atlantic Blvd.
Norcross, GA 30071
tel. (404) 448-1263
fax (404) 734-5486

to 10 memorized stations; parental lock by station or time (but not both simultaneously, unfortunately); and an illuminated, programmable remote (which can control two VCRs, the TV, and one additional piece of equipment).

The standard audio/video adjustments can be called up easily without going through multiple menu layers. They take up minimum space on the screen (using bar-graph displays), and they must be individually set for each input. While this last point may seem to be an inconvenience, it does allow, for example, your carefully calibrated and tweaked laserdisc input settings to remain undisturbed when the baby sitter turns the brightness and contrast all the way up while watching pay-per-view.

By far the most interesting feature of the VS-6085 is StarSight. It would take an entire article just to fully describe this feature, but briefly, it is an onscreen program-guide service (available for a subscription fee of roughly \$1 per week) that displays upcoming shows in the form of a *TV Guide*-style grid. For additional relief from information overload, the program grid can be organized and displayed by specific "themes." StarSight also provides "one-touch" recording, controlling your VCR from an IR emitter that plugs into the back of the set and sticks over the VCR's IR receiving window.

If you have one of the new DSS or other satellite systems that provides its own program guide, or watch only limited broadcast television from just a few stations, you either won't need StarSight or you will find its complexity—it does

require you to become close friends with the manual—an unnecessary exercise. But for the cable-hopping couch-potatoes among us, it's very slick.

The VS-6085's built-in sound system is better than average—full-bodied and pleasant enough to listen to on most standard broadcast programs. (There are also connections for external speakers and an outboard, powered subwoofer.) But for the best audio-for-video experience, you'll want a good, separate sound system. There's also an input that lets you use the built-in speakers and amplifiers as a center channel (but doing so

disables the set's subwoofer output and the internal "subwoofer"). This is not an option I would seriously consider, except as an interim step to a good center-channel speaker matched to the rest of your outboard sound system.

Incidentally, when there is no sound input to the set (as might be the case when playing a laserdisc through an external sound system), the speakers



emit a low-level but audible hiss. I was on the verge of criticizing the processors I reviewed elsewhere in this issue for noisy center-channel outputs until I realized that the noise was coming from the television! The solution is to mute the Mitsubishi's built-in sound system when it's not delivering program material.

The nitty gritty

Now that we've dispensed with the bells and whistles, it's time to get down to business. How does the set perform?

I could regale you with details on the VS-6085's video technology, including its 7-inch CRTs with 6-element hybrid lenses, 3D Y/C comb filter, and regulated power supply, but none of this adds up to beans unless the final result—the picture—adds up. And it does.

Yes, the picture is too blue in the high color-temperature setting and too yellowish-sepia in the mid and low settings. And yes, as with all big-screen sets, mediocre cable and broadcast quality is laid bare for what it is (not to mention variations in program quality

from station to station and even on different programs from a specific station as well). The clearer and bigger the window, the more depressing the smog is on a bad day. But on a clear day, the view is glorious.

In the factory "Normal" settings of the user video controls (brightness, contrast, color, tint, and sharpness), the Mitsubishi's picture is marginal by perfectionist standards, although the general public must like the look—Mitsubishi does sell a few big-screen TVs, or so I've heard. At the factory-standard set-

Calibration

All the observations in this review were made prior to adjusting the Mitsubishi for a proper gray scale. After calibration, the colors were definitely more natural, although I still felt they were slightly "off" in a way that might bother some viewers. The excess blue was gone, but there was a small but persistent yellowish-sepia tinge. This was similar, but much smaller in degree, to the tint noted in the standard factory

setup with the Medium and Low color-temperature settings.

Some of my discomfort was undoubtedly due to the need to acclimate to a proper color palette; the average eye adjusts all too easily to the typical too-blue look of standard television settings.

After adjusting the Mitsubishi, flesh tones ranged from excellent (on an ESPN broadcast of a swimming meet) to a bit too orange (on laserdiscs).

Backing off the color control helped a bit with the latter problem; the slight oversaturation of red noted in the review was more evident after gray-scale calibration than before.

Calibration itself is a rather touchy affair on the VS-6085. An onscreen service menu is provided for adjusting the red and blue drive (for high light levels), but only for the High color-temperature setting, not for Medium and Low.

The screen adjustments for low-light levels use internal potentiometers for red, green, and blue. These are the pots from hell! They are almost impossibly touchy to adjust (an all-too-common design characteristic in many sets),

with a usable range of about one or two degrees. In the end, however, patience paid off with respectable results. Nevertheless, easier adjustments might have permitted further experimentation, and thus a better chance to eliminate that slightly tinted look in the resulting picture.

How can the "after" results (using the High color-temperature setting) be as respectable as they are in the adjoining chart while the color still looks not quite right? The color analyzer is internally calibrated for standard phosphors (SMPTE "C" or EBU; the former should be used in NTSC setups). Since all sets use slightly nonstandard phosphors, the absolute accuracy will be a little off, although nowhere near as far off as those too-blue factory settings. Combine that with the Mitsubishi's so-so color decoding and the fact that all modern televisions are factory optimized for a ridiculously high light output, and the possible reasons for the not-quite-right appearance of the post-calibration image become clear. Again, I must note that further tweaking might well result in a slightly more acceptable compromise.

Even though I carefully adjusted the user video controls for proper operation using *A Video Standard* (a mandatory step prior to making any gray-scale adjustments), these settings—brightness, contrast, color, tint, and sharpness—all reverted to their factory



ting, peak brightness was a CRT-searing 130 foot-Lamberts, and the decidedly soft look of the picture was a clear sign of blooming.

Using the laserdisc *A Video Standard* to perform the initial setup [this procedure was covered in depth in our Spring 1996 issue, Vol. 2 No. 1—Ed.], I ended up with the contrast two or three clicks above the bottom of its range, brightness just below center, tint at slightly red, color at 80 percent, sharpness in the center, and the color temperature on High. (I found the sepi-yellow of the Mid and Low

settings subjectively much less natural than the blue shift of the High setting.)

Actually, I cheated a bit on the contrast setting: rather than eyeballing it as most people would do, I used *SGHT's* Minolta LS-100 spotmeter to set the peak brightness at a more reasonable (for a set of this size) 15 foot-Lamberts. In a darkened room, this was more than adequate for serious viewing; for casual use in normal room lighting, one of the other inputs can be used and adjusted for more light output.

As in most modern sets, the video ad-

justments increase and decrease in steps, and the steps are much too coarse. With the brightness control in particular, the "correct" setting is between two steps; the lower step is slightly too dark and the next higher step is slightly washed out. This is not the only set I have tested that has this problem. Nevertheless, proper adjustment—even prior to gray-scale setup (see sidebar)—provides a stunning improvement in picture quality in a proper viewing environment (i.e., a room with *very* subdued lighting).

With the best program material, col-

defaults upon entering the service menu. Fortunately, there are subcontrols in the service menu that can be used to recalibrate the mid-points (standard settings) of these controls. I had to reset these sub-controls before the gray scale could be properly set.

Altogether, it took three times longer to calibrate the Mitsubishi than a comparable Toshiba PTV that LEU is reviewing for a future issue (3 hours vs. 1 hour). Many Mitsubishi direct-view sets now include all their setup adjustments in service menus; hopefully, this will work its way into the company's PTVs as new models are introduced.

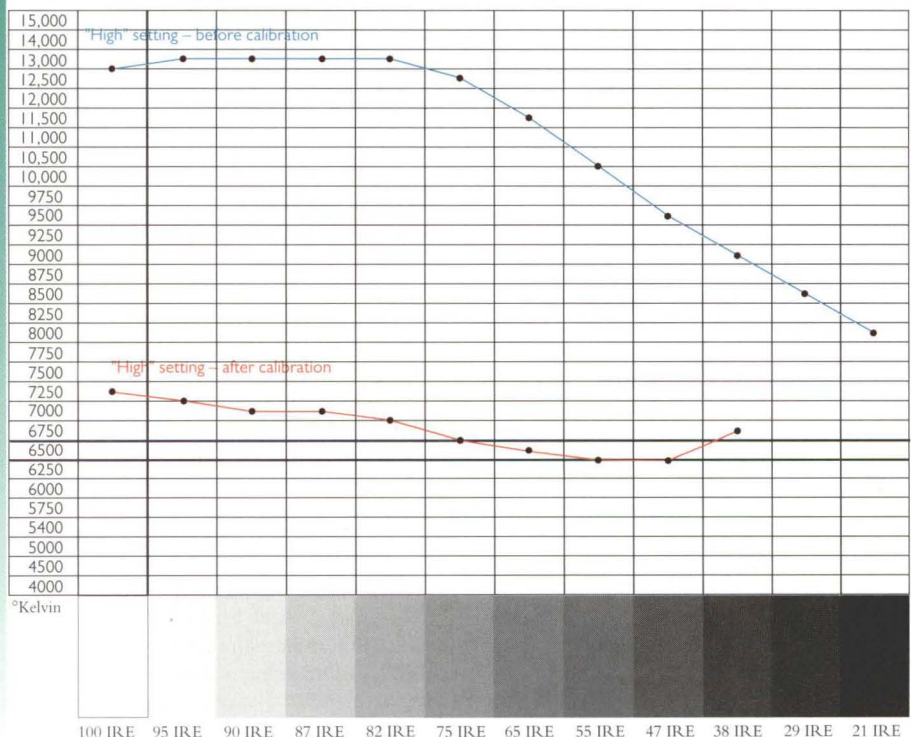
Incidentally, if you have a calibration performed and the technician sets these subcontrols so that the mid-points of the user video adjustments are correct, you should be aware that some settings of the user controls produce some

strange effects. Specifically, the picture disappears at very low contrast settings. The menus remain visible, but they look very odd: the lettering expands and the colors change. Not

to worry; these are settings you would never use. If you see the problem, simply reset the user controls for that input and start over.

—TJN

Gray-scale tracking @ 15 ft-Lamberts



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ors are clean and fully (but not overly) saturated. Shadow detail is good. Yes, scanning lines are visible (from about 12½ feet away) but not distracting. (Some may find them so. There is a wide range of individual response to scanning lines, and some viewers may want to sit farther away or consider a smaller set.) Sharpness is excellent—this is one of the best sets I have seen in this regard—and video noise is low.

While the picture sometimes seems a little grainier than competitive sets from, say, Pioneer and Sony, this may simply be a result of the crispness of the image revealing minor flaws in the program material that are glossed over by other sets. There is a delicate design balance to be struck here, but on my current favorite laserdisc test material—*Wind, Africa: The Serengeti, The Shadow, Congo, Beverly Hills Cop III* (some of these are mediocre films but all of them are first-class transfers)—the VS-6085 looked better after proper adjustment than any 60-inch PTV I have tested to date.

I have only one serious criticism: The black-level retention of the VS-6085 is mediocre. A full black screen is more gray than black, and some dark scenes look a little washed-out. It was not possible to correct this problem with the brightness control without degrading the image on brightly lit scenes, which are very well reproduced.

This isn't a visual disaster and probably won't even be noticed by most uncritical viewers. Furthermore, when the picture is properly adjusted, it doesn't have that inky look that afflicts many other sets. Nevertheless, this is an area in which improvements to the basic design would pay big dividends.

I also noticed an uneven black level on the screen whenever the set was reproducing a totally black signal (such as a fadeout between scenes). The left side—particularly the lower left—is lighter than the rest of the screen. There are also some visible internal reflections [which are caused by stray light bouncing around inside the cabinet—Ed]. They are not severe, but they are visible when, for example, a small, brightly lit object moves across an otherwise darkened screen.

These are common problems with

most consumer PTVs—not only Mitsubishi's—probably because they don't show up in typical showroom demos and thus receive less R&D attention than the latest PIP or POP bell and whistle. In any case, the factory settings are so grossly out of whack, they make discussion of these subtleties moot for the vast majority of consumers. If they only knew....

My review set also exhibited a more unique problem. The first couple of

The Mitsubishi kept me interested, and after living with a \$30,000 projector/line-doubler package for several months, that's not faint praise.

times I turned it on, the picture began flashing red after about an hour's use. This happened about once a minute: It would flash red for an instant, then go back to normal color. Upon observing this phenomenon, my spirits sank; arranging for a second sample of a product this size is a reviewer's worst nightmare. But the problem stopped after a day or two, and has not recurred in over a month's heavy use. Teething problems, perhaps?

For more objective measurements, I checked the VS-6085 using a number of test patterns from *A Video Standard*. Resolution measured about 380 lines, which is more a limitation of the program source than the set. The geometry is good, but it could be better: The center is slightly stretched laterally.

The corners are good for a big-screen set, but not ideal, and slight pincushioning is visible at the perimeter.

There is too much overscan, although the full safe-picture-area frame is visible on three sides and just hidden from view on the fourth. Convergence (checked with a crosshatch pattern after setup) is good in the center but only fair on the perimeter. (It was never a problem in normal viewing.)

The 3D Y/C comb filter is clearly excellent, with no obvious hanging or crawling dots visible on the color-bar pattern. However, the color decoder is only fair. Reds seem a bit oversaturated, but this is not a serious problem on program material. There were two slight gray discolorations or smudges on the screen of my sample, both about one inch from and parallel with the bottom; the larger one measured roughly 4 inches long and ½ an inch wide, and the smaller one was about 1½ inches long and the same width. Neither of these areas was a distraction in normal viewing (and they disappeared completely on letterboxed films), but both were clearly visible during bright scenes.

A diamond in the rough

There is no such thing as a television that can't be improved. The Mitsubishi VS-6085, while not perfect, is still a superb set. If it was a bit of a comedown after living with the video projectors I reviewed in our last issue, I was surprised at how quickly I re-adapted. I missed the impact of the larger picture from the projectors, and the line-doubled Runco's near-invisible scanning lines had to be traded off for the inevitable distractions (though, for me, not debilitating) of 480 lines on a 60-inch screen.

Nevertheless, the Mitsubishi kept me interested, and after living with a \$30,000 projector/line-doubler package for several months, that's not faint praise. I can definitely recommend the Mitsubishi VS-6085 (and the identical VS-6087). It's a serious contender in the high-end television sweepstakes. When the terms Elite and XBR spring into your head, think Diamond, too. **SGHT**

PROTON WT-3650

DIRECT-VIEW TELEVISION

Lawrence B. Johnson



For several years now, manufacturers have pondered or even dabbled in widescreen (16:9), direct-view televisions for the U.S. market. Those on the sidelines have watched in horror or glee (depending on their own widescreen marketing plans) as one company after another sent a new widescreen gladiator into the retail arena, only to see it die ignominiously after an apathetic public turned thumbs down. For example, Thomson's widescreen models languished on dealers' shelves until the company offered purchasers a "free" DSS system with each TV. Ouch!

The virtual abandonment of the 16:9 direct-view market bears noting because Proton's new WT-3650 widescreen set boldly takes the company where others have, well, gone before and thought better of it. Some elements of picture-tube design aside, the WT-3650 offers no novel spin (or stretch) on widescreen televisions that have preceded it. And in that light, it actually

bears witness to the problematic issues of 16:9 in a 4:3 world.

Behind bars

It might be useful to begin by recapping the way both 4:3 and widescreen images translate to a 16:9 television. Readers with an aversion to the black bars at the top and bottom of widescreen, or "letterboxed," images on conventional televisions might run from the room screaming at the sight of an unaltered 4:3 picture on a 16:9 television.

An unaltered 4:3 image projected onto the 34-inch (diagonal) screen of the Proton WT-3650 simply occupies the middle of the screen, measuring a bit larger than any ordinary 27-inch (diagonal) picture. This means you get broad vertical bands of black on each side of the picture.

Proton WT-3650

widescreen direct-view television

Screen diagonal: 34"

Aspect ratio: 16:9

Dimensions: 38.63"x 25.63" x 23.5" (WxHxD)

Inputs: 4 sets of A/V inputs; 3 S-video inputs; 2 RF inputs

Outputs: 2 audio outputs;

1 composite video output; 1 S-video output

Weight: 199 lbs.

Price: \$5000

Manufacturer:
Proton Corporation
13855 Struikman Road
Cerritos, CA 90703
tel. (310) 404-2222
fax (310) 404-2322

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Without making any adjustments, the image from a 1.85:1 or 2.35:1 widescreen laserdisc fills the same central sliver of that 27-inch image area (within the 34-inch screen) that you'd expect to see on any 27-inch set. In other words, you now have black bars not only on the top and bottom, but on the sides as well.

But, of course, you probably wouldn't want to watch *T2* or *The Abyss* in widescreen format on a 27-inch television, and that's not how you would expect to view it on the 34-inch Proton. This is where picture alteration (or stretching) comes in. Your first option is to activate a "Full Screen" view of the 4:3 picture. (This is true for any widescreen set.) If the image really is 4:3 to begin with, filling out the 16:9 screen distorts the geometry of the picture, and the actors suddenly have broadened foreheads, squared jaws, and lengthened cheek bones. Wheels and basketballs look like Dumbo the elephant sat on them.

Frankly, I find it inconceivable that anyone would actually prefer to look at such a distended picture. And yet I've seen widescreen sets demonstrated that way, for both consumers and the press, without so much as a mitigating word! Fortunately, this distortion doesn't occur when a widescreen image is displayed in "Full Screen" mode, because the height of the picture is increased along with the width.

However, you may still have narrow black bars at the top and bottom of the exploded widescreen picture unless you engage the vertical and horizontal zoom. This feature lets you extend the image vertically to eliminate the accursed black bars, then stretch the image laterally to restore the look and shape of real people. In technical terms, this lets you recapture the correct geometry. The upside of stretching a widescreen image to fill the screen is that all the resolving power (scan lines) of the screen are utilized. As you widen the image, though, the right and left edges disappear off the sides of the screen.

By the way, if you go into the zoom mode with a regular 4:3 image (in order to restore that Earthling look), the top

and bottom of the picture are automatically cropped. In *Twins*, for example, this lopped off the top of Arnold Schwarzenegger's head down to his nose in one scene. In the character-defining scene in which Danny DeVito drops a gift of cheap aftershave into a wastebasket, the zoom mode chopped away the wastebasket, making it look as if DeVito might simply be dropping the bottle onto the floor. Compared with such electronic slashing, pan-and-scan seems downright artistic.

The Proton's vertical and horizontal zoom provides 15 increments in each direction. Curiously, the incremental values are not the same on the vertical and horizontal scales; each vertical step represents a slightly greater value than each horizontal step. You must

**Compared with
such slashing,
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eyeball the stretched image for correct geometry.

After spending several hours jumping through these hoops, I found myself asking why—beyond the requirements of this review—I was doing it. If my late grandfather, a gruff old railroader, was still alive, he might declare the whole business "a lot of damn nonsense." And he would be right. The full-screen picture on the Proton extends 29½ inches wide; the width of the plain ol' 4:3 Mitsubishi CS-40805 40-inch reviewed in the previous issue of *SGHT* [and featured in this issue's "Recommended System"—Ed.] is 32 inches. And the diagonal measure of a normal 4:3 picture on the Mitsubishi is, uh, 40 inches, not 27. The Proton sells for \$5000, the Mitsubishi for \$4000; you figure it out.

Picture this

As for picture quality, the Proton is pretty good, but not scintillating—and that's the problem. It reminds me of a concert hall with slightly diffuse acoustics: you're never really drawn into the emotion of the music; you never really connect with it. I spent hours watching movies on the Proton, and while I found much to admire, I never quite experienced the kind of three-dimensionality that struck me instantly with the Mitsubishi CS-40805.

The Proton's picture bore a distinctly blue cast and betrayed a marked absence of shadow detail straight out of the box, but it acquired more natural hues after John Gannon's painstaking corrections in accordance with standards of the Imaging Science Foundation (see "Calibration" sidebar). But even after correction, the picture still lacked a compelling presence, including the pulling power of a deep, stable black level and the resulting lifelike textures and shadow detail that draw you into the drama of an image.

The set provides three color-temperature settings: Natural, Rich, and Warm. As I have explained in the accompanying sidebar, Natural is rather unnatural. Once that setting was corrected to the NTSC standard of D6500, built-in mathematical relationships caused the other two settings to become irrelevant.

The Proton makes its strongest impression in a substantially darkened room. In this environment, hues intensify and detail sharpens. But in a room with typical lighting, whether incandescent or solar, the picture loses some vitality. The problem is particularly conspicuous in *The Abyss*, which is shot almost entirely in low light. In a typically well-lit room, the image falls into a mood of gray two-dimensionality. *Twins*, much of which was shot outdoors in dazzling light, displays more vivid colors, but this gain comes with another compromise: in really bright light, hues tend to wash out.

To give Proton all benefit of doubt, one could surmise that the WT-3650 was designed as a videophile component, to be used in muted lighting

much like a front-projection setup. If so, why is the factory-set contrast so severely overdriven? And why, as Gannon observed, is the video amplifier virtually unable to support the picture? Gannon suggests that the Proton picture might be greatly improved without the scan-velocity modulator and what appears to be an automatic black-level controller, which together seemed to impose havoc rather than control on contrast.

Ample amenities

Parked on a tabletop, the WT-3650 is a stylish-looking television, its broad aspect made sleek by uncluttered lines and a minimal frame. And on paper, the WT-3650 boasts an aggressive technical design. Elements include

**Elements
include 600-line
horizontal
resolution and a
dynamic beam
focus circuit.**

600-line horizontal resolution, digital comb filter, video noise reduction, and what Proton calls a "dynamic beam focus circuit" to assure uniform focus over the entire picture tube. Another

circuit, called the "optimum video image enhancer," is said to assure a detailed, crisp, noise-free picture.

Ample inputs and outputs are provided on the back panel, including two S-video inputs and one S-video output. In addition, one set of A/V inputs (again with an S-video option) is offered on the front on the set.

Other amenities include dual-tuner picture-in-picture (with the ability to place the inset picture in any corner of the screen), a strobe effect, single-frame freeze, and channel-scanning. The internal sound system, which I did not turn on as usual, features Spatializer circuitry to produce a multidimensional effect from a stereo signal without the use of extra speakers.

The remote is compact with large

Calibration

John Gannon, my consultant from the Imaging Science Foundation, approached the Proton WT-3650 with great enthusiasm, only to become increasingly vexed with its design and performance.

He characterized the set's scan-velocity modulation and automatic black-level control (which Proton calls "dynamic black-level extension")

as "Band-Aids to compensate for a video amplifier that's overdriven to make the picture excessively bright so it can compete with other excessively bright pictures in a brightly lit retail store."

He went on to say, "The lack of an intense involvement in shadow detail reflects very clearly what we saw in the boxes (IRE window patterns on A Video Standard)." When

Gannon switched from a pure white box to a dimmer box, the surrounding area turned from deep black to gray, thanks to the overly aggressive auto-black circuit. In addition, whenever the contrast shifted from scene to scene—or even from one camera angle to another—the gray scale also changed. "The blue phosphor can't keep up with the red and green," Gannon explained.

Before any ISF corrections were made to the gray scale, the Proton's picture showed a bluish cast. And when Gannon reduced the contrast level from its factory-set maximum level to a more natural look, the blue became even more evident; the color temperature jumped to 10,200° Kelvin.

The set offers three color-temperature settings: Natural, Rich, and Warm.

Proton told Gannon the Natural temperature would be 9000° Kelvin; it measured 9250°. After Natural was adjusted down to 6500°, "preset mathematical relationships" (as Proton calls them) within the set left the Rich setting nearly identical with Natural and pushed Warm off the usable scale.

After ISF correction, Gannon measured the light output at 18.5 foot-Lamberts, which he judged disappointing for a direct-view set of its size and price. (By comparison, the 40-inch Mitsubishi CS-40805 measured 23 foot-Lamberts.)

Gannon also noted inaccuracies in the Proton's color decoding. It emphasizes red, probably to compensate for the excessive blue. Convergence was also off, with red being out of convergence throughout the tube and, as Gannon said, "significantly off" in the lower left-hand corner. "That's a quality-control problem," according to Gannon.

The set also displayed a pronounced inward bowing of the image on the left side. It was conspicuous on the blue box that frames the THX logo at the beginning of *The Abyss*.

Gannon said he was "very pleased with the set's ability to hold gray down to low light." It also held its brightness when the aspect ratio was switched from



buttons for volume and channel up/down. Partly as a function of this compactness, you must scroll through menus to get at the specific adjustment you wish to make. The Select button doubles as the menu-entry button, so you must puzzle that out or seek help in the owner's manual, which you shouldn't need to do for so basic a matter. The onscreen level displays are clear enough.

Puzzling it out

This is the most puzzling television I've ever come across. I stand with consumers who balk at the idea of pushing and pulling a 4:3 image to fit a wide screen; perhaps more accurately, I've seen no real usefulness in doing so. By now, the industry as a whole has backed

Just how objectionable are the black bands on a widescreen image anyway?

away from widescreen direct-view sets for a simple reason: they didn't sell.

On the other hand, it stands to reason that a company such as Pioneer would commit its entire line of rear-projection TVs to a wider-than-normal aspect ratio (in Pioneer's case, 16:10.7).

Widescreen images make more sense on the large screen of a rear-projection set. In addition, many serious video collectors are laserdisc enthusiasts, and widescreen releases now dominate the newer laserdisc titles. Moreover, big-screen PTVs have emerged as the fastest-growing segment of the television market. Simply put, that's where the hobbyist home-theater action is.

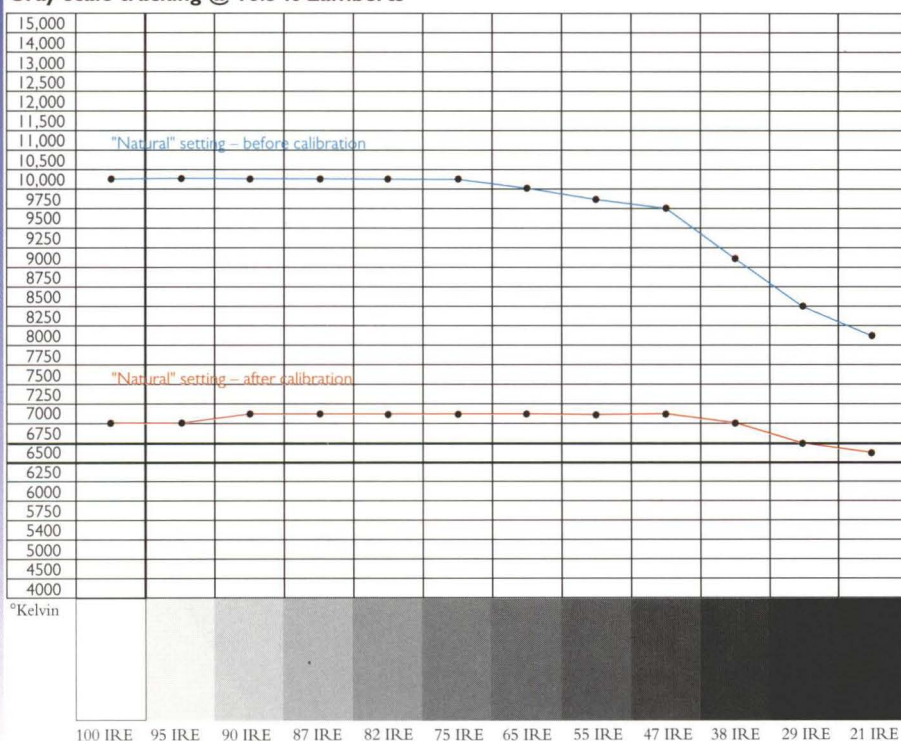
But beyond the widescreen debate, the performance of the WT-3650 is just so-so. There are plenty of splendid alternatives, especially at the heady price of \$5000. For that much money, you could have the Mitsubishi 40-inch and a stack of laserdiscs or a knockout 60-inch PTV. Just how objectionable are the black bands on a widescreen image, anyway? **SGHT**

4:3 to widescreen. The picture geometry in general was pretty good, too, he said.

Getting into the set to make adjustments is a major hassle. It turns out that only special service remotes permit entry into the service mode; at the time of this evaluation, there was only one such device in the United States. But Proton was extremely cooperative about getting that remote to Gannon. Yet there was a further persistent complication: every time the television sensed signals from the service remote, it reverted to maximum contrast, making every adjustment a complete restart. —LBJ

Special thanks to John Gannon of AudioVideo Insight, Dearborn Heights, MI; (800) 272-4411.

Gray-scale tracking @ 18.5 ft-Lamberts



GRAPH DESIGN © IMAGING SCIENCE FOUNDATION

ZENITH SR3589

DIRECT-VIEW TELEVISION

Lawrence B. Johnson

I'm glad that my lot in life is not to market consumer electronics—especially video products. I've always been told by manufacturers and retailers alike that there's no profit in televisions, to say nothing of camcorders. The pricing of camcorders is cut desperately close to the bone and illustrates a perverse axiom: "We lose a few dollars on each piece, but we make it up in volume."

According to my friends in the business, televisions aren't much different. With audio components, a retailer might make 40 "points" (dollars of profit per hundred of the selling price). However, he or she typically does well

to salvage 10 points on a television, particularly a direct-view model. The margins are better in big-screen models, or so they say.

This was the direction in which my thoughts wandered as I contemplated the paradox of the Zenith SR3589, a 35-inch direct-view

television priced at \$3000, and the same-size RCA F35760 (which I reviewed in the Spring 1996 *SGHT*, Vol. 2 No. 1) priced at \$2100. At the top of Zenith's current line, the SR3589 produces an agreeable picture, but

it's not without some notable problems. For about two-thirds the price, the RCA offers a picture that holds up honorably in close comparison with the best direct-view televisions available at any price.

Marketing is about perception, cachet, tradition—any number of things that may have nothing to do with quality. One thing's sure: Between this \$3000 Zenith and the \$5000 Proton reviewed elsewhere in this issue, I'm scratching out the entry in my book of clichés that says you get what you pay for.

As for the Zenith's performance, the juxtaposition of its reasonably good picture and its hefty price tag keeps deflecting my thoughts down other avenues. For example, consider the Magnavox TP3272C, a 32-inch direct-view set I reviewed in the Summer 1996 *SGHT* (Vol. 2 No. 2). Its price is \$900, and its performance is extraordinary for the price. There's the problem. I could find nothing extraordinary about the Zenith SR3589. Its most remarkable feature is a somewhat inflated price. The plain fact is

that I could not connect emotionally with the Zenith. Why not?

Connecting point

Two points come to mind: color and the less quantifiable issue of vitality. The palette of this television is a mixed bag of accuracy and hues that suggests less than high-tech achievement. Out of the box, the picture has a rather pale aspect, which I was not able to improve substantially using the standard consumer controls.

As I increased the color intensity, I created orange people—prominently so in the opening scene of *Twins*, with the all-American mother and all-universe team of fathers gathered in the research lab. This scene is one of the most difficult tests for flesh tone because the oddly uneven lighting tends to produce a strong element of orange. The Zenith's "electronic flesh-

Zenith SR3589

direct-view television

Screen diagonal: 35"

Inputs: 3 sets A/V inputs; 1

S-video input; 2 RF inputs

Outputs: 1 set A/V outputs

Dimensions: 37.5" x 34.1" x 27.8" (HxWxD)

Weight: 178 lbs.

Price: \$2995

Manufacturer:

Zenith Electronics Corp.

1000 Milwaukee Avenue

Glenview, IL 60025

tel. (847) 391-7000

fax (847) 391-7869



tone correction" tends to exacerbate that Sunkist look.

John Gannon, my consultant from the Imaging Science Foundation (ISF), suggested that the auto flesh-tone circuit is a crutch to compensate for a gray scale that is seriously skewed toward blue. He recommended switching it off in any case, and it certainly served no purpose once the set's color temperature had been corrected.

Correcting the color temperature was quite an adjustment in this instance. From a starting point of 12,600° Kelvin, Gannon initially turned the color temperature down to the NTSC standard of D6500. However, this caused the gray-scale tone to take on a rosy hue. A correction up to 6700° produced the proper gray (see "Calibration" sidebar).

While Zenith touts the efficacy of its digital comb filter, which should minimize or eradicate random "crawling" color dots, this television displays conspicuous dot crawl in the transitions between color bars in the SMPTE display. Otherwise, the set offers a fairly well-balanced color scheme (after some serious tweaking), except for a touch of pinkish-orange in the flesh tones. This problem was not unique to *Twins*; I found it also in *The Abyss* and *Don Juan DeMarco*, both of which have always impressed me with the accuracy of their flesh tones on correctly calibrated monitors.

Once the pervasive rose tone is exorcised, the television actually presents a true red. The fire trucks in *Backdraft*, Danny DeVito's Mustang in *Twins*—my two favorite reference points for red—both displayed a deep, vibrant color. However a qualifier must be attached here, as well. Smaller surface areas, such as Johnny Depp's red vest in *Don Juan DeMarco*, looked quite good, but massive areas of red (the fire trucks and car) were consistently flecked with black. A red fire hydrant (lacking the shiny surface texture of the vehicles) was blotched to the point where it took on a cardboard two-dimensionality.

Very much to Zenith's credit is the controlled performance of the televi-

**To Zenith's
credit is the
controlled
performance of
the television's
scan velocity
modulation
circuit.**

sion's scan velocity modulation circuit. [Scan velocity modulation dynamically adjusts the rate at which the electron beam traces scan lines on the screen. The intent is to give black-and-white images more "punch"—Ed.] Its effect is so unobtrusive that Gannon assumed no such circuit was present, which is a far cry from the distorted black-to-white transitions that beset the picture in the Proton WT-3650.

Featured features

To return to the mystery of marketing, it's fascinating to observe how little emphasis Zenith has placed on technical performance-related features in promoting the SR3589. The sales pitch is slanted toward amenities, and the most prominently touted of these is the set's ability to receive StarSight's electronic program guide.

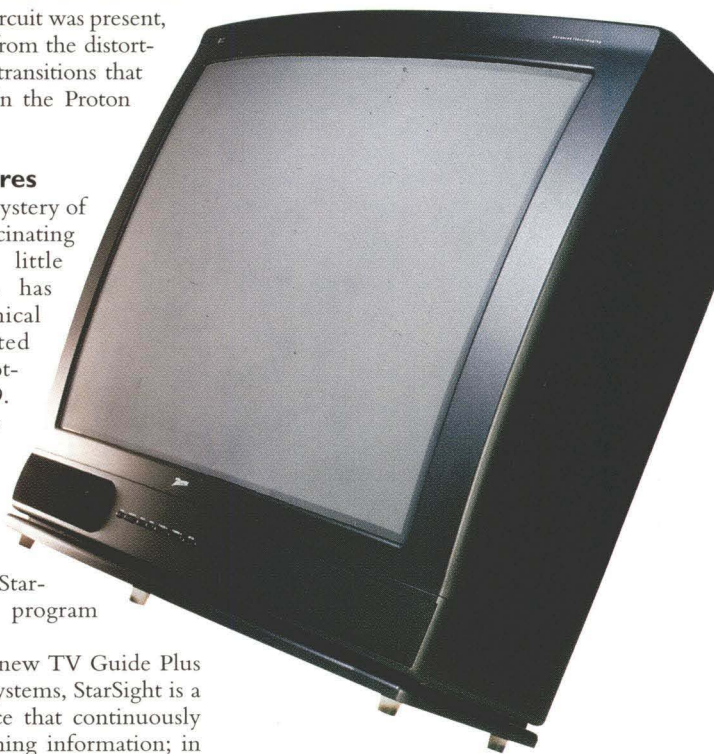
Not unlike the new TV Guide Plus and VideoGuide systems, StarSight is a subscription service that continuously updates programming information; in this case, for the current day and the next six days. One of the most appeal-

ing features of StarSight is that it provides one-touch remote-control setup for recording future programs.

The Zenith offers picture-in-picture, which requires an external source for the second image. Color and tint of the inset picture can be adjusted independently of the main image; the location and size of the inset picture also are adjustable.

The television comes with two remotes. One is a conventional-looking device that's quite sensibly laid out and manageable. A second, smaller, and more streamlined remote called Z-Trak was clearly designed for the computer-fluent. It uses a trackball (essentially, an upside-down mouse) to move a cursor around the screen for point-and-click operation.

What might be characterized as an aggressive onscreen menu system caused Gannon some headaches (see the accompanying sidebar). I treated



the set's built-in sound system (hyped for its 15 watts of total power) with the same even-handed neglect I accord the sonic side of all televisions. The smoothly understated lines of the cabinet focused attention where it belonged: on the screen.

To market, to market

In a market crowded with remarkably good televisions for significantly less

money, this 35-inch Zenith looks like a tough sell. But another marketing axiom holds that this brand name carries a long-standing cachet with a great many consumers. Indeed, the SR3589 presents an agreeable picture, albeit without much in the way of distinguishing qualities.

Out of the box, its image is extremely blue, which surely allows the set to compete in the azure sweep-

stakes that take place in most television showrooms. Viewed strictly as a video monitor, this is not a candidate for the critical videophile. Less exacting shoppers may be lured by the StarSight factor, which perhaps adds some legitimacy to the formidable price. If you're looking for an involving, exciting direct-view television, see my reviews in the Spring and Summer 1996 issues of **SGHT**.

SGHT

Calibration

Correcting the gray-scale on the Zenith SR3589 proved to be a challenge for technician John Gannon of AudioVideo Insight in Detroit. Like the Proton WT-3650, the SR3589 was initially "pushing red" to compensate for the picture's extreme skew toward blue.

Out of the box, the upper end of the scale was calibrated to 12,600° Kelvin. "When I calibrated it to D6500, everything had a rosy, or sepia, hue," said Gannon, "so I had to recalibrate at about 6700° to get rid of the red in the gray scale. This is not an inaccuracy in the color decoder, because the red tone existed throughout the picture."

Gannon noted that Zenith provides for adjustments only at the top end of the gray scale, apparently relying on an internal circuit to monitor and adjust the bottom end. Curiously, the bottom of the gray scale, which measured about 7000° when the high end was brought into line with the NTSC standard of 6500° (or, as it turned out, 6700°).

"In the end, I was able to obtain a very good-looking gray scale," Gannon said, "but I've never before had to misadjust a TV to get its gray scale correct. I've never seen

anything like it. This is why I say there's a little more art than science in what I do."

Gannon also ran into some unexpected difficulty judging the effect of changes he made in the color temperature. The Zenith's onscreen display fills much of the viewing area, making it hard to evaluate what is happening to the image behind the graphics as you change parameter values.

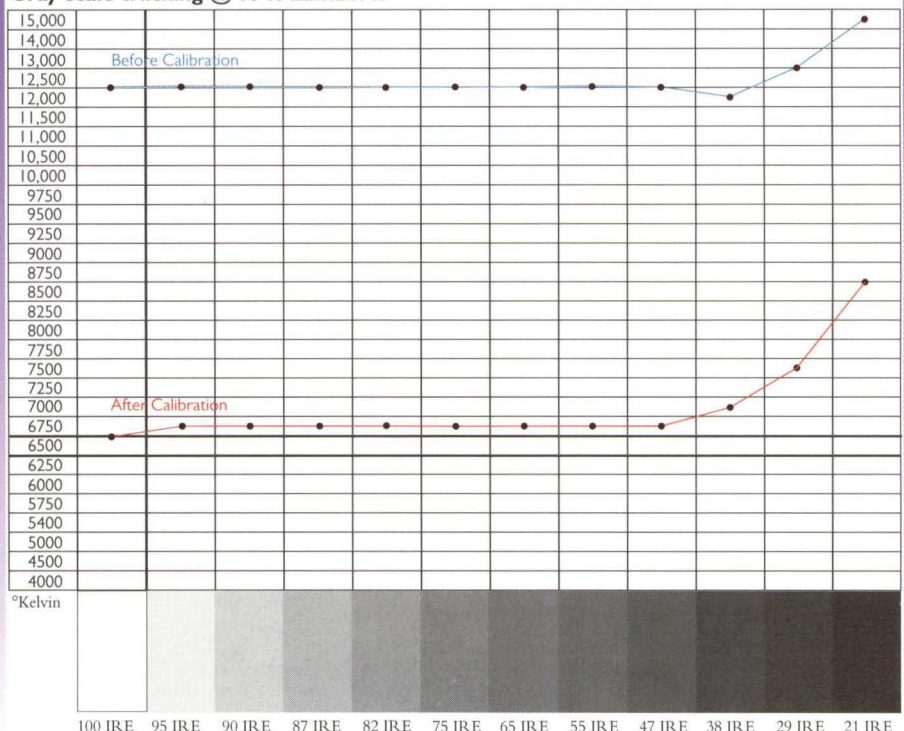
The Zenith got high marks from Gannon

for its geometry and convergence. "Both are quite good. The geometry is near-perfect, and it's striking how accurate the convergence is on this set compared with the almost unacceptable condition of the Proton."

—LBJ

Special thanks to John Gannon of AudioVideo Insight, Dearborn Heights, MI; (800) 272-4411.

Gray-scale tracking @ 19 ft-Lamberts



GRAPH DESIGN © IMAGING SCIENCE FOUNDATION

MERIDIAN 565

SURROUND PROCESSOR

Thomas J. Norton

Among high-end audio manufacturers, UK-based Meridian has shown perhaps the most single-minded dedication to multi-channel audio. The company's upscale Digital Theater, which will run you more than \$66,000 if you choose all the available options, is still the only all-digital, surround-sound playback system on the market.

The heart of the Digital Theater is the Meridian 565 surround processor. All the processing in this device is done in the digital domain. (An analog input undergoes a digital-to-analog conversion upon entering the unit, something that analog-forever audiophiles won't like.) The 565 was previously reviewed in *Stereophile* (Vol. 18 No. 6), along with the rest of the Meridian Digital Theater, but there have been a number of updates to the unit since then, most significantly Dolby Digital (AC-3) playback capability.

The 565 is the most flexible surround processor I have ever seen. It accommodates just about any setup configuration you can imagine, including full-range or bass-limited loudspeakers at any position and single or multiple subwoofers. You can even drive the left and right front loudspeakers full-range with music and use a subwoofer only in the film modes. In addition, you have the option for one, two, or four surround speakers (or none, even in Dolby Digital mode).

Aside from the normal Dolby adjustments, the 565 also lets you alter the relative delay of the center-channel speaker, moving its effective position by $\pm 2\frac{1}{2}$ feet forward or back. The standard film modes (Pro Logic, THX, and AC-3 with or without appropriate THX processing) are joined by several dedicated—and very effective—music surround modes. Straight stereo is also available for music playback, if desired. In short, you name it, and the 565 probably has it; anything it doesn't have was probably considered carefully by Meridian and rejected as unnecessary.

The more Meridian the merrier

In one respect, the 565 is *not* particularly flexible by itself. It has only three

audio inputs—digital coax, digital TosLink (optical), and RCA analog—and a single video input. There are no tape monitor loops. A buyer building a system around so expensive a processor will probably be dissatisfied with this limitation.

To circumvent this input shortage, most buyers will probably opt to add Meridian's 562V Digital Controller (\$1995). Identical in size to the 565, this outboard unit connects to the processor using a separate digital link and provides seven analog and seven digital inputs, onboard A/D conversion for the analog inputs, digital and analog tape loops, six composite and two S-video inputs, and two composite and S-video outputs for a VCR and the monitor. It is also possible to expand the number of analog sources by connecting any separate stereo preamplifier to the Meridian's single pair of analog inputs. In this review, however, I examine the 565 alone, with sources connected directly to it through one of its three audio inputs and single video input.

To decode Dolby Digital AC-3 material from laserdiscs, you also need Meridian's 519 RF demodulator (\$695). A demodulator is required to convert the RF-modulated AC-3 information on laserdiscs to a digital datastream for input to the 565. The 519 connects to both the AC-3 and standard digital outputs of a laserdisc player. If it senses an AC-3 signal, it switches to AC-3. If not, it feeds the standard Dolby Surround digital information to the 565. (Incidentally, I could not find an explanation of this in any of the manuals; there is a diagram for the hookup, but no explanation of the switching feature.) The RF link is coaxial; TosLink optical and coaxial inputs and

Meridian 565

THX-certified surround processor
Audio inputs: one pair L&R analog, one coaxial digital, one TosLink digital
Video inputs: one composite
Analog audio outputs: L&R front, L&R sides (double as L&R subwoofer outputs if so configured), L&R rear; center; subwoofer
Digital audio outputs (all coaxial): main L&R, center & sub, sides & sub, rear L&R
Video output: one composite
Additional I/O: Comms and S-Leads for use with

other Meridian products (note: S-Leads are not related in any way to S-video connections); RS232 connection for future expansion, including computer interface
Dimensions: 12.7" x 3.5" x 13.1" (WxHxD)
Weight: 10 lbs.
Ser. #: 565 201002
Price: \$4490
Options: 562V Digital Control Unit, \$1995; 519 laserdisc AC-3 demodulator, \$695.
Distributor: Meridian America Inc. 3800 Camp Creek Parkway Building 2400, Suite 112 Atlanta, GA 30331 tel. (404) 344-7111



outputs are provided for the other connections.

You must also connect the analog outputs of the laserdisc player to the 565 if you wish to access the analog tracks (for older discs lacking digital soundtracks, special-edition commentary, or simply if you prefer the analog tracks). The RF demodulator increases the package price, but you only need it for Dolby Digital on laserdiscs, not the upcoming DVDs (on which the Dolby Digital signal is not RF modulated).

Manual labor

My first exposure to the 565 involved Meridian's original instruction manual, which was nearly indecipherable. The 565 is actually a computer designed to perform specific tasks, and that first manual read just like bad computer documentation. The new manuals (there are now three: one for installation, one for normal use, and one just for the remote control) are a definite improvement over the old. But there are still some rough spots, and it is still too easy to stumble while setting up, configuring, and operating the 565. About 75 percent of the problems could be solved with better manuals; the rest by better ergonomics.

Basic hookup is straightforward enough, but there are so many possible configurations that 10 diagrams appear in the installation manual to describe them. Meridian also adds to the possible confusion with unnecessary hype. For example, one diagram is entitled

"to connect to a (Meridian) 555 stereo power amplifier" instead of "to connect to a stereo power amplifier." Another title reads "to connect to a (Meridian) M2500 active subwoofer" instead of "to connect to an active subwoofer." If, like most buyers, you will be using the 565 with a conventional system and not Meridian's full Digital Theater, generic descriptions would be less confusing, and you would only need to refer to four of these diagrams (three if you don't use the 562V controller).

Once the 565 is hooked up, the process of configuring the unit begins. I will not describe this in full detail—it takes 13 pages in the Installation Guide. They are small pages, and the instructions are not really all that intimidating, but the descriptions are not always clear.

There is, for instance, a potential confusion between side and rear surrounds. To clarify (which the manual does not): The "rear" outputs on the

565 are used to drive the surrounds when only one or two are used, no matter where you place them. "Side" refers to the side-positioned channels, which are used only when there are both side and rear surrounds (i.e., four surround speakers).

Further confusion could arise from the fact that the left and right subwoofer outputs serve double duty with the side outputs. The 565 configures these outputs in accordance with the user's selected setup. You cannot use stereo subs *and* four surrounds at the same time.

The manual also contains several unclearly annotated tables. In two of them, the columns are labeled with numbers corresponding to output jacks, but this is not plainly stated. And in one of these tables, the word "centre" is positioned almost directly above the column for the mono subwoofer output. It is small details like these that create user confusion.

A few more ergonomic quirks, both in setup and operation, caused me some frustration. All the calibration signals produced a crackling noise in the center channel, regardless of the speaker being calibrated. (This did not appear to affect the accuracy of the calibration.) Furthermore, I couldn't enter the calibration mode with the AC-3 indicator showing on the front panel; I understand that this has been corrected in later units.

In addition, when you first switch the unit on, there is no display on the front panel; you must select an input before anything happens. I thought the processor was broken before I figured this out.

There were other operating concerns as well. When you change any parameters in a particular mode, those changes disappear if you switch to another mode and subsequently return to the original mode. To save your changes, you must create and save a special user preset; there is enough memory to allow up to 16 user presets to be stored, but you'd better take

Meridian has shown perhaps the most single-minded dedication to multi-channel audio.

good notes if you use them all.

Also, you cannot change the bass level on the fly while listening; however, you *can* change the surround and center levels. The remote is neither illuminated nor particularly intuitive. And you cannot completely disable the onscreen menus; for example, making a minor level adjustment always produces a distracting onscreen display.

The most frustrating ergonomic oddity is the hardest to describe, but I'll try. You cannot switch DSP modes after adjusting any mode parameters unless you manually return the front-panel display to the mode's name (i.e., Pro, THX, etc.). The display automatically reverts to the mode name after a brief delay following a parameter adjustment, but if you allow it to do this, that last adjusted parameter remains in background memory. If you then attempt to switch modes, that parameter comes up on the display instead of a mode change. You can switch to a different mode *only* if you actively return the display readout to the mode name. This really isn't so bad once you figure it out, but I spent nearly an hour scratching my head trying to solve the puzzle. Again, I thought the 565 had crashed.

The silver lining

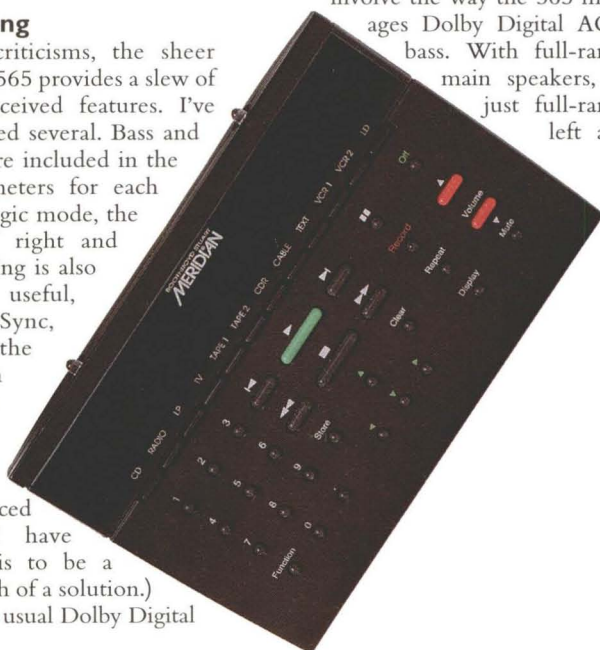
Despite these criticisms, the sheer flexibility of the 565 provides a slew of useful, well-conceived features. I've already mentioned several. Bass and treble controls are included in the adjustable parameters for each mode. In Pro Logic mode, the degree of left/ right and front/ rear steering is also adjustable. Less useful, perhaps, is LipSync, which adjusts the delay between sound and video by up to one video frame, to compensate for slightly mis-synced soundtracks. (I have never found this to be a problem in search of a solution.)

Of course, the usual Dolby Digital

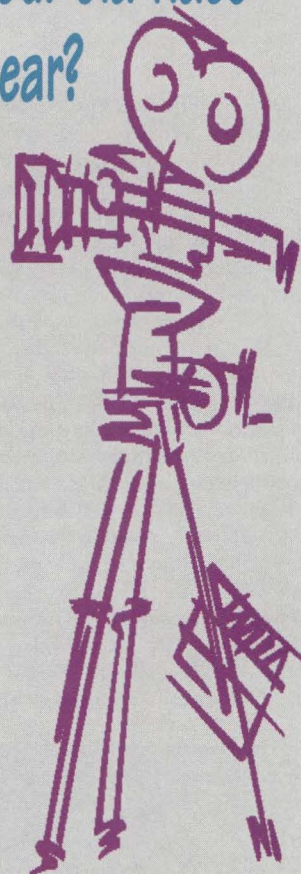
The sheer flexibility of the 565 provides a slew of useful, well-conceived features.

AC-3 features are present, including variable compression. In AC-3 with THX, there is the normal THX re-equalization of all channels and timbre matching of the rears; the latter is specially configured to account for the full-range rear channels. The rears are also decorrelated, which sounds like a dicey thing to do with discrete rear channels, but I noted no negative effects from it. (Meridian claims their decorrelation is relatively mild.) Of course, re-EQ, timbre matching, and decorrelation do not apply in the standard, non-THX AC-3 mode.

Perhaps the most interesting features involve the way the 565 manages Dolby Digital AC-3 bass. With full-range main speakers, or just full-range left and



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right fronts, the bass in the main AC-3 channels is routed to the full-range speakers, as selected in the initial setup configuration. Without a subwoofer, the 565 may be configured to route the LFE bass (the 0.1 part of 5.1 channels) to the same full-range speakers. Alternately, if you have one or more subwoofer(s), the LFE bass can be fed to them. In addition, the subwoofer(s) can also receive the bass from the main channels. The LFE bass can extend to 80 or 120 Hz on the top end, though this does not circumvent the 80 Hz crossover on the main channels, when this option is selected.

To minimize possible bass overload, Meridian has provided some useful control over the maximum bass levels that are fed to the full-range speakers and subwoofers. In AC-3, the relative level of the LFE channel can be set as well as its maximum. There is also an

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adjustable peak-level limit for the total bass signal fed to the subwoofer or the


main speakers. However, the use of these parameters is not well explained in the manuals. The maximum bass levels can also be fine tuned by specifying the size of the woofer in each full-range speaker or subwoofer in the system.

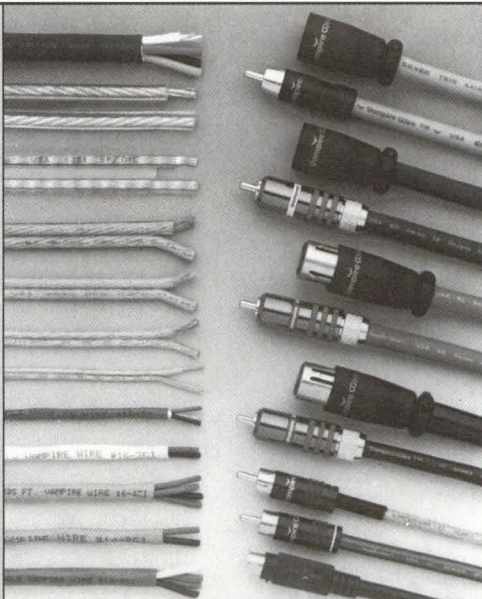
This description does not cover every possible function available in the 565. The Meridian processor is so flexible that I wouldn't be surprised if the manuals have omitted a wrinkle or two. And since all the internal operations are software-based, future updates to the features and decoding are relatively simple. Most of my quibbles, for example, could probably be addressed by rewriting a few lines of code.

Finally, in addition to its standard analog outputs, the 565 provides digital outputs for all the channels. This is unique in an AC-3 processor, and its main purpose is to drive the powered speakers in Meridian's own Digital Theater (which have their own internal D/A converters prior to the power amps). There is nothing to prevent you from using your own outboard D/A converters with the 565 in a conventional system, though you would need at least five channels' worth of conversion. Furthermore, the onboard DACs in the 565 are very good; Meridian makes some of the best D/A converters around.

The system

The home-theater system used to audition the 565 was fronted by a Pioneer Elite CLD-79 or a Theta Data III/Theta DS Pro Basic III transport/converter combination. (A Meridian 563 DAC was also used briefly in some of the comparisons. It had a functional problem—an occasional crackling sound, perhaps indicating a marginal digital lock—but nothing appeared to be amiss in its basic sound quality.) The rest of the system included a Carver AV-806x multi-channel power amplifier, Triad Gold LCR speakers, a Velodyne ULD-18THX subwoofer, and either the KEF Reference AV2 or Citation Model 7.3 Dual Drive dipole surrounds. The interconnects and front loudspeaker cables were from XLO/VDO; in-wall Monster cables fed the surrounds.





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Time for a listen

All my operational reservations about the Meridian faded into the woodwork when I began listening to it. While it is not the best surround processor I have heard in every respect, it is right up there with the best, and in several important ways, I have not yet heard anything else to equal it.

In particular, I have yet to hear AC-3 replay of this quality from any other processor. It is perhaps significant that this is the first processor I have heard that uses proprietary software to decode AC-3; all previous processors I have heard use the Zoran chip. [See "AC-3: The Chips are Down" in this issue for more on this topic—Ed.] The slight edge I've sometimes heard in the past from AC-3—which can sometimes hide in the guise of enhanced definition or dynamic range—is nearly absent with the 565.

I have commented before that AC-3 bass is frequently very tight and detailed, but it sometimes sounds less extended and awesome—in quantity, not quality—than its Pro Logic counterpart. Not with the 565. The overall dynamic range is striking, as you would expect from AC-3, and the sound remains clean at all levels. (I did all my serious AC-3 listening to the 565 with AC-3's compression feature turned off.)

The newly remastered *Top Gun* will knock you out in Dolby Digital on the Meridian. It is solid, clean, and slams you to the mat without letting up. I

The 565 has a resolution that is totally involving, particularly in the separation and depth perspective of the front channels.

have never been a big fan of this movie (it is not a particularly accurate depiction of typical fighter pilots, flying, or dogfights), but it takes on a new life with this big, punchy soundtrack.

Crimson Tide, a better film in all respects (from the same producers), is also a riveting experience in AC-3 on the 565. It was during this movie that I first noticed the superiority of the AC-3 bass over Pro Logic. And although this soundtrack is a little brighter-sounding than *Top Gun*, it is still a major achievement. The same goes for the soundtrack from *Congo*. While the film as a whole has some major problems, sound is not one of them. In particular,

Jerry Goldsmith's superb

symphonic score is wonderfully reproduced in Dolby Digital by the 565.

For now, however, most of your home-theater film experiences will continue to be based on Pro Logic replay, for which the 565 also uses Meridian's own software. In Pro Logic (and THX), the 565 is up there with the best in sonic timbre and steering, and it is the absolute best I have yet heard in the depth and definition of its bass.

I first listened to the 565 on its own via the digital and analog inputs, which were connected to the Pioneer Elite CLD-79. Of course, there is no theoretical advantage in avoiding the Meridian's digital input, and plenty of reasons to use it. In particular, this sidesteps a complete D/A and A/D conversion sequence. It is a tribute both to the A/D converter in the Meridian and the DAC in the Pioneer that the two configurations are as close as they are. I experienced no revelations in the direct-digital connection, but it *did* sound slightly better—a bit more open on top and slightly stronger on the bottom.

The more I listened to the 565, the more I liked it. It has a resolution that is totally involving, particularly in the separation and depth perspective of the front channels (notable especially in the reproduction of the musical score on good soundtracks). Combine this with natural dialog and that tight, deep bass, and you have a winner. And I can't forget to mention that the video circuitry in the 565 is as close to transparent as I have yet found, challenged only by the Proceed PAV for top honors.



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Meridian 565

I found that the 565 came up a bit short in one respect. Compared with the Proceed PAV and Citation 7.0, I felt the latter two processors did a noticeably better job of portraying ambience. The soundscape was less open, airy, and natural with the 565. The difference was most pronounced against the Citation, but also evident with the Proceed. It was close, but the size of the portrayed sonic environment shrank noticeably when switching from the Proceed or Citation to the Meridian. Switching to the Meridian's split-surround mode—intended to simulate stereo surrounds—did not change this result. (All levels were as closely matched as the processors allowed, and the surround delays were the same.)

I have not yet experimented with the Meridian's combined side and rear surround configuration; I am awaiting the arrival of a speaker setup that will provide me with four matched surrounds. Since such speakers were not available prior to deadline for this review, I saw no particular advantage in setting up a compromised, unmatched surround array. Suffice it to say that there are plenty of good reasons for acquiring the Meridian 565 even if you plan to use a conventional, two-speaker surround setup. I hope to comment on the Meridian in the expanded mode in a future "Take 2."

Music to my ears

The Meridian 565 is designed primarily to play surround-sound music. Prior experience with an earlier sample of the 565 convinced me that it is superbly suited to music-only use. It is challenged by only one or two other processors for this type of playback; the Citation 7.0 with its six-axis mode comes immediately to mind.

The Meridian's various music modes are very well thought out. My personal favorite is Tri-field, a sophisticated version of passive Hafler-style L-R decoding that provides some control over the soundstage width and spaciousness. The 565 can also decode recordings made using the Ambisonic process. (There are many such titles available, particularly on the Nimbus label.)

For those who want to do their

music listening in stereo only, the Meridian is a first-class 2-channel pre-amp/converter. I auditioned the current sample in this application in my audio-only system (Sumo Andromeda III power amplifier, Energy Veritas v2.8 speakers, TARA Labs RSC Reference and Cardas Hexlink interconnects, Monster M1.5 loudspeaker cable), and I have no serious criticisms.

In this application, the Theta Data III transport was linked to the 565 with a Kimber AGDL coaxial digital cable. The reference front-end replaced by this setup (which included the Theta DS Pro Basic III driving a Rowland Consummate preamplifier) is marginally superior—with tighter, deeper bass and a slightly better overall mix of sweetness and detail—but at more than twice the cost. However, if you add the 562V Digital Controller into the equation, the price of the Meridian system gets closer to that of the reference. And the Meridian gives you full surround capabilities, while the Theta DAC combined with the Rowland preamp is strictly 2-channel stereo.

Conclusion

My ergonomic concerns with the Meridian 565 suggest that most users should plan on dealer setup rather than a do-it-yourself installation. I must admit that the more familiar I became with the manual and the more hands-on experience I got, the less intimidating the Meridian's setup and operating idiosyncrasies became. Nevertheless, a good dealer is best positioned to acquire this familiarity and could save you hours of aggravation.

I am not entirely happy with this situation; a product with which the owner can become intimately familiar is best in the long run. I suppose it's akin to doing your own taxes so that you understand them. But with a product this expensive and complex, I believe you are entitled to full dealer installation and support.

Ergonomics aside, this is a superb-sounding, highly flexible product. It joins a handful of surround processors that are capable of state-of-the-art, home-theater sound. **SGHT**

CARVER TFM-35X

STEREO POWER AMPLIFIER

Robert Deutsch

One of the issues in the tube *vs.* solid-state controversy is whether differences in the sound of various amplifiers can be attributed to easily measurable differences in electrical characteristics. Tube and solid-state amplifiers differ in a number of ways that show up in measurements; perhaps the most striking difference is in the output impedance.

The output impedance of tube amps is usually much higher than that of solid-state amps, and high output impedance is known to result in frequency-response variations as a function of speaker/crossover impedance. If this is what gives a tube amplifier its distinctive sound—which is admired by many audiophiles—then it may be possible to mimic the sound of tubes with a transistor design.

In the product nomenclature of Carver power amps, “TFM” stands for Transfer Function Modification, which refers to the modification of the electrical characteristics of a solid-state amplifier circuit to increase the output impedance. The idea is to wring the sound of tubes from solid-state circuits so you don’t have to worry about tube replacement, drifting bias, heat, etc.—or so the theory goes.

If you’ve managed to follow this sketchy description of TFM, congratulations. If you haven’t, don’t worry about it. You see, the Carver TFM-35x is *not* a TFM amplifier! Jim Croft, Carver Corporation’s Vice President of Research and Development, told me that the original TFM-35 was indeed a TFM design, but during the redesign that resulted in the “x” version, the decision was made to drop the TFM circuit.

According to Croft, the TFM-35x has a low output impedance, so its frequency response remains linear regard-

less of speaker impedance variations. The TFM-35 had been a popular model in the line, so they kept the TFM designation strictly for marketing reasons. (The word is that future models from Carver will not use the TFM moniker.) The redesign was fairly substantial and used knowledge gained in the development of the Lightstar Reference (which I reviewed favorably in the May 1995 *Stereophile*).

The TFM-35x has a new input stage, designed for maximum separation and low DC offset. The power supply features three discrete rail voltages that track the signal level; the Lightstar Reference has a similar “tracking” power supply, except its tracking is continuously variable. As in the Lightstar Reference, particular attention has been paid to reactive load interactions in the TFM-35x.

I’m told that the TFM-35x is Carver’s most popular amplifier, outselling the closest amplifier in the line, the A-400x (\$685), by a ten-to-one ratio. I was originally slated to review the A-400x, and I actually received the review samples. Then I got a call from Carver’s Mark Cerasuolo, who told me the company decided to drop the A-400x from the line, and that he’d be sending me review samples of the TFM-35x instead. It’s a good thing I hadn’t hooked up the A-400x yet; sometimes procrastination pays off.

Watch that dial

The TFM-35x front panel is dominated by two round power meters, with one switch for range (0 dB=25W or 250W) and another to turn the meter illumination on and off. Initially, the meters are fun to watch. (You might be surprised at how little power is used in routine listening, and that a slight increase in volume requires a *lot* more amplifier power.) Once the novelty wore off, though, I found the meters’ bouncing needles distracting.

As the TFM-35x manual points out, the actual power on musical peaks may well exceed the power indicated by the meters, and “the best way to tell whether the amplifier is overloading is to listen.” Precisely. So why didn’t Carver just save

Carver TFM-35x

solid-state stereo power amplifier

Power output: 250W into 8 Ω , 350W into 4 Ω

Bridged power output: 700W into 8 Ω

Full power bandwidth: 20 Hz–20 kHz

THD: <0.5%

IM distortion: <0.03%

Dynamic headroom: 2.5 dB at 8 Ω , 2.8 dB at 4 Ω

Slew rate: >10V/ μ sec

Damping factor: >150

Frequency response:

20 Hz–20 kHz (+0, -0.25 dB)

S/N ratio: >91 dB

(A-weighted, ref. 1W), >115 dB

Crosstalk: >60 dB at 1 kHz

Input impedance: 47 k Ω

Sensitivity: 1.58V RMS

for rated power into 8 Ω at 1 kHz

Power consumption: 70W at idle, 400W with musical program, 1100W at full power into 8 Ω (continuous)

Dimensions: 19" x 4.5" x 17.75" (WxHxD)

Weight: 25.3 lbs.

Warranty: 3 years, limited

Ser.#s: 9622070254,

9622070267,

9622070279

Price: \$899

Manufacturer:

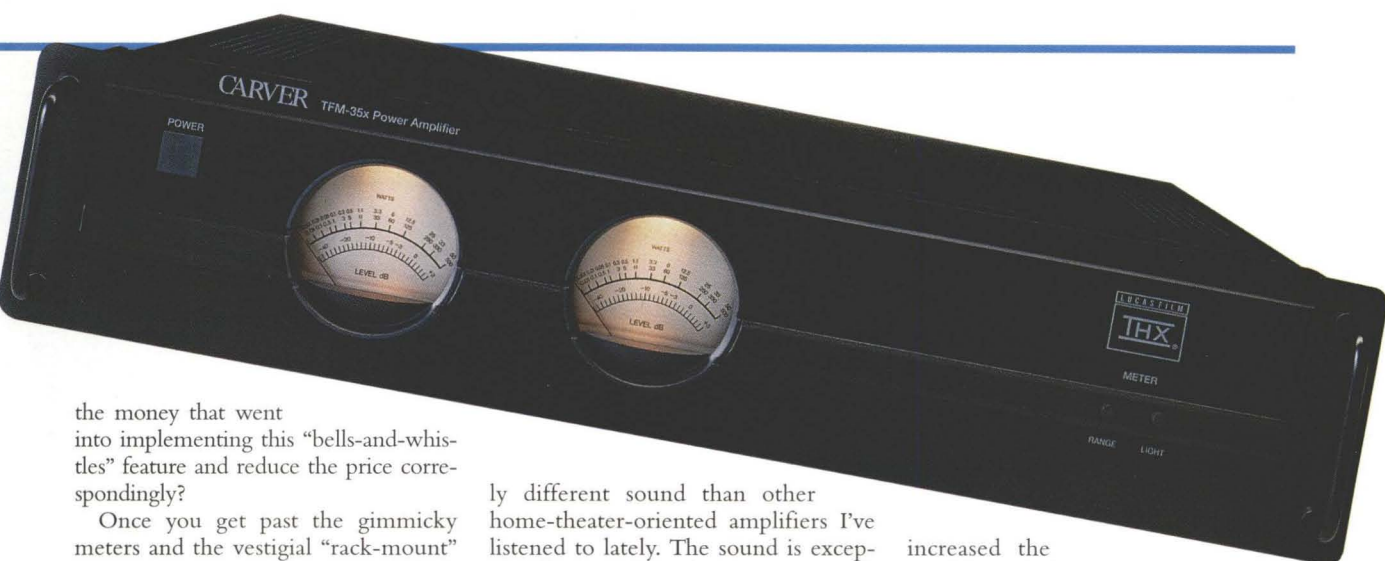
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the money that went into implementing this “bells-and-whistles” feature and reduce the price correspondingly?

Once you get past the gimmicky meters and the vestigial “rack-mount” handles (don’t get me started on *that!*), the TFM-35x looks like a solid, well-built piece of audio equipment. The binding posts seem strong enough to stand up to heavy use, and there’s a rugged 16-gauge power cord. Unlike some early Carver amplifiers, the TFM-35x uses a conventional EI transformer rather than the controversial “magnetic field” power supply.

The TFM-35x is THX approved, which means (among other things) that it’s capable of delivering substantial power into a variety of loads. The rated power is a very substantial 250W into 8Ω, and a whopping 700W into 8Ω in the bridged mono configuration. (The manual warns against using a 4Ω speaker with the amplifier in the bridged mode.)

Smooth operator

From the very first time I heard the TFM-35x in my stereo audio-only system (see sidebar), I knew I was dealing with an amplifier that has a significant-

ly different sound than other home-theater-oriented amplifiers I’ve listened to lately. The sound is exceptionally smooth, with a sweet top end, natural timbres, and a good rendering of soundstage.

The Carver does particularly well with voices, both male and female, with a rounded presence and well-controlled sibilants. For example, Sylvia McNair’s voice on *Sure Thing: The Jerome Kern Song Book* (Philips 442 129-2), one of my picks for *Stereophile*’s 1995 “Records To Die For,” had an in-the-room quality that’s difficult to come by.

If I didn’t know that the TFM-35x no longer includes the TFM circuit, I would have thought that something of that sort was part of the design. Nevertheless, my impression is that the frequency extremes sound slightly rolled off, although certainly not to the extent found with some classic tube amplifiers. (Audiophiles who are into tweaky accessories might be interested to know that a single Shakti Electromagnetic Stabilizer, placed on the chassis above the transformer, noticeably

increased the amplifier’s clarity and openness.)

Among the solid-state amplifiers of my recent acquaintance, the one that most closely resembles the TFM-35x’s sound is (surprise!) the Carver Research Lightstar Reference. Although I no longer had the Lightstar Reference around for direct comparison, my listening notes for the two amplifiers include a lot of similarities.

Both amplifiers tend to present detail in a somewhat forgiving manner, rather than revealing the warts and all, which is a definite advantage with the many recordings that have more than their share of warts. My recollection of the Lightstar Reference is that it’s a bit more detailed than the TFM-35x, with more effortless dynamics at high level, but then it costs more than four times as much.

Comparisons

I did some matched-level (± 0.1 dB) comparisons between the TFM-35x

Review Systems

Stereo Audio-only

Analog front-end: AudioQuest AQ-7000nsx, Linn Ittok, Linn LP-12 (fully updated)

Digital front-end: PS Audio Lambda II and Sonic Frontiers SFT-1 transports, Audio Alchemy DTI Pro32 anti-jitter/resolution-enhancement device, Sonic Frontiers SFD-2 digital processor

Preamplifiers:

Balanced Audio Technology VK-5, Convergent Audio Technology SL-I Signature

Loudspeakers:

Dunlavy SC-IVs

Interconnects, speaker cables, power cables:

TARA Labs RSC Decade

Accessories:

Chang CLS-9600 ISO power line conditioner, Original Cable Jackets, Shakti Stones, Bright Star Little Rock

Home Theater

Laserdisc player: Pioneer CLD-604

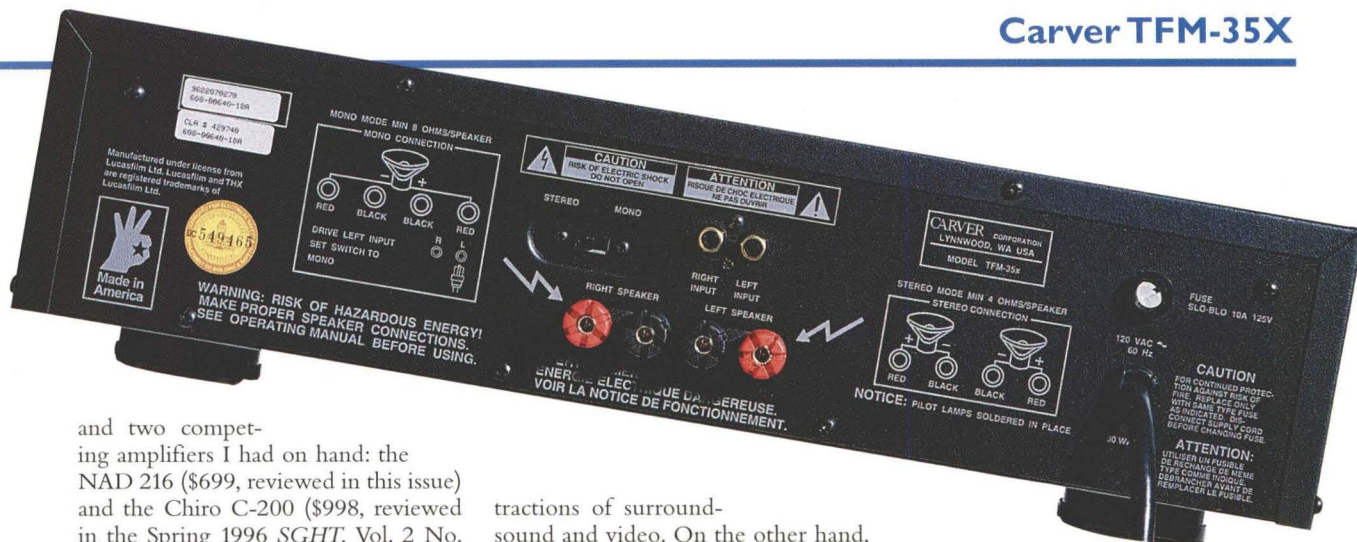
Surround processor/preamp: Citation 7.0

Loudspeakers: Dunlavy SC-Is (5)

Subwoofers: Velodyne F-1500R, NHT SW-3/SA-3

Cables: AudioQuest Emerald interconnects, Type 4 and Crystal speaker cables

Accessories: Chang CLS-6400 power-line conditioner



and two competing amplifiers I had on hand: the NAD 216 (\$699, reviewed in this issue) and the Chiro C-200 (\$998, reviewed in the Spring 1996 *SGHT*, Vol. 2 No. 1). As I note in its review, the NAD has a slight edge over the Carver in bass response and dynamics; however, it also has an edge of another, less desirable sort, in the upper midrange/treble.

Through the NAD, the big ensemble scenes of *Turandot* (London 414 274-2) sound unduly hard and congested, with voices more forward than ideal. The Carver gives up a bit of detail, but overall, I much prefer its more laid-back, relaxed presentation.

The Chiro C-200 is also ahead of the Carver in bass clarity, and it has slightly better dynamics. However, its presentation of upper midrange/treble detail is clean and natural-sounding, although it's more forward than the Carver. The choice between the C-200 and the TFM-35x is a tough one, depending on whether you lean toward clarity and detail (Chiro) or a smoother, more laid-back sound (Carver). In their own ways, each of these two relatively low-priced amplifiers provide more than a glimpse of what real high-end performance is all about.

What about home theater?

Up to now, my discussion of the TFM-35x's sound quality has been in the context of a stereo audio-only system, which is arguably the best way to evaluate an amplifier without the dis-

tractions of surround-sound and video. On the other hand, if an amplifier is to be used in a home theater, why not evaluate it that way? Why not, indeed.

As I've said before, I'm not as critical of audio in a video-oriented system as in a music-playback system. However, this is not to say that I don't think audio in a home-theater context is not important. If finances permit, of course you should get the best possible sound equipment to complement the video. If you're not fortunate enough or obsessive enough to have separate stereo and home-theater systems, the home-theater system's sound quality should be satisfying when playing music.

I installed three TFM-35x amplifiers in my home-theater system and proceeded to play an assortment of laserdiscs. Happily, they delivered the goods. Their power is certainly useful for producing levels typical of THX theaters (where I often stuff bits of tissue in my ears to protect my hearing from the sonic onslaught), and they worked well to communicate the music as well as the crashes and explosions.

Leap of Faith is an underrated movie that includes some very realistic sound effects (e.g., the trucks rumbling by in the opening sequence) and a fabulous *a cappella* gospel choir number. The TFM-35xs took it all in stride, keeping the voices in the choir distinct and nat-

ural-sounding. The slight bass softness I heard in my stereo system was not evident here, which is not surprising since frequencies below 80 Hz are shunted to the subwoofer in my home-theater system. The TFM-35x's easy way with the upper midrange was helpful in not exacerbating already overly bright movie soundtracks.

Buying advice

With well-matched associated components in a stereo system or a two-unit (4-channel) or three-unit (6-channel) home-theater configuration, the Carver TFM-35x is able to effectively communicate musical values while minimizing the electronic artifacts that are invariably part of the sound-reproduction process. It's very modestly priced but doesn't sound like it.

There are two groups of audiophiles to whom I particularly recommend the TFM-35x: those who are drawn to the tonal qualities of tube amplifiers but don't want the responsibility of their care and feeding, and those who are attracted to the sound of the Carver Lightstar Reference but deterred by the price. Anyone who thinks of Carver products as being strictly mid-fi should listen to the TFM-35x. In the right system, it can give the big boys a good run for their money. **SGHT**

Comments

The frequency response and crosstalk results were very good. The signal/noise ratio and distortion results were excellent.

Measurements

Clipping (1% THD+noise at 1 kHz): 265 Wpc into 8Ω, both channels driven; 349 Wpc into 4Ω, both channels driven; and 601W into 2Ω, one channel driven. Clipping in bridged mode, 690W into 8Ω (also at 1 kHz, 1% THD+noise). —TJN

NAD 216 THX & 214

STEREO POWER AMPLIFIERS

Robert Deutsch

Ask an audiophile whose interest in the field goes back to the early '80s about NAD, and you'll get two responses: "3020" and "soft clipping." Anyway, that's the association I make when I think about NAD. Model 3020 was NAD's best-known product. Probably the most successful integrated amplifier of all time, it provided more-than-decent sound for a more-than-reasonable price. I haven't owned one myself, but I know several people who have, and some of them continue to use it as a preamp now that they have a separate power amplifier.

Soft clipping is NAD's term for output limiting that prevents the abrupt increase in distortion that "hard" clipping generates. Back in the days of the NAD 3020, you could establish your credentials as a serious audiophile by making it clear that of course you listened to the 3020 with soft clipping *off*. (The consensus was that soft clipping, while effective in avoiding overload, had a detrimental effect on signal purity at levels below clipping.) The NAD 3020 is history now, although NAD does offer an integrated amp that's said to be its linear descendant: the 304, which is a *Stereophile* Class C Recommended Component.

Since those halcyon days, NAD's offerings have expanded to include a whole slew of power amplifiers, preamplifiers, receivers, and surround processors. The 216 THX and 214 reviewed here are second and third from the top of their amplifier line, respectively; the top model 208 THX (\$1499) was reviewed by Tom Norton in the February 1995 issue of *Stereophile*.

Clip softly but carry a big power supply

Like the venerable NAD 3020, the 216 THX and 214 have a soft clipping circuit that prevents overload. Also like the 3020, this feature can be switched off. The switch is on the back, so it's meant to be a set-and-forget feature; as a card-carrying "serious" audiophile, my advice is to leave it off unless you find that the amp really does go into clipping (which produces an abruptly harsh and distorted sound) when playing loud. Unlike the 3020, the 216 and

214 are capable of substantial amounts of power, so they're not as likely to be driven into clipping.

In designing the 216 and 214, NAD paid a lot of attention to the power supply, which they describe as "stiff." An amplifier with an ideally stiff power supply is able to maintain the same output voltage regardless of the load; with each halving of load impedance, the output power doubles. Thus, such an amplifier rated at 100W into 8 Ω would put out 200W into 4 Ω and 400W into 2 Ω .

The 216's and 214's specifications reveal that their power output does not quite double in an inverse relation with impedance; however, amplifiers capable of this feat are invariably expensive (e.g., the big Krells). The 216 and 214 are rated to handle load impedances as low as 1 Ω , and their power supplies feature toroidal transformers and banks of reservoir capacitors instead of a single pair, an arrangement that's said to yield superior performance as well as being more economical.

The 216 fulfills THX requirements, which means (among other things) a demonstrated ability to deliver substantial power into a variety of load impedances. In the bridged (monophonic) mode, power is tripled into an 8 Ω load, but the amplifier is less able to deal with lower speaker impedances.

The input- and driver-stage circuits have separate, regulated, low-noise power supplies. A set of relays provide on-off muting and protection against DC, overheating, short circuits, and what the product

NAD 216 THX

solid-state stereo power amplifier
Power output: 125W into 8 Ω , 200W into 4 Ω
IHF dynamic power: 170W into 8 Ω , 280W into 4 Ω , 400W into 2 Ω
Bridged power output: 400W into 8 Ω
IHF dynamic power (bridged): 560W into 8 Ω , 800W into 4 Ω
Full power bandwidth: 20 Hz–20 kHz
THD: <0.03% (20 Hz–20 kHz)
THD+SMPTE IM+IHF IM: <0.03%
Dynamic headroom: 1.3 dB at 8 Ω
Slew rate: >70V/ μ sec
Damping factor: >200
Input impedance: 60 k Ω
Input sensitivity: 1.1V
Voltage gain: 29 dB
Frequency response: 20 Hz–20 kHz, \pm 0.2 dB; -3 dB @ 2 Hz & 100 kHz
S/N ratio: 98 dB (ref. 1W); 119 dB (ref. rated power)
Dimensions: 17.25" x 5.5" x 14" (WxHxD)
Weight: 31 lbs.
Ser.#s: G5321604571, G5321604573
Price: \$699

NAD 214 solid-state

stereo power amplifier
Power output: 80W into 8 Ω , 120W into 4 Ω
IHF dynamic power: 110W into 8 Ω , 180W into 4 Ω , 250W into 2 Ω
Bridged power output: 240W into 8 Ω
IHF dynamic power (bridged): 360W into 8 Ω , 500W into 4 Ω
Full power bandwidth: 20 Hz–20 kHz
THD: <0.03% (20 Hz–20 kHz)
Dynamic headroom: 1.4 dB
Slew rate: >60V/ μ sec
Damping factor: >200
Input impedance: 60 k Ω
Input sensitivity: 900 mV
Frequency response: 20 Hz–20 kHz, \pm 0.2 dB; -3 dB @ 2 Hz & 100 kHz
S/N ratio: 98 dB (ref. 1W); 117 dB (ref. rated power)
Dimensions: 17.25" x 5.5" x 14" (WxHxD)
Weight: 25 lbs.
Ser. #: G4821400493
Price: \$449
Manufacturer: NAD Electronics USA
89 Doug Brown Way
Holliston, MA 01746
tel. (508) 429-2525
fax (508) 429-2426



NAD 216 THX

information sheet ominously calls "other abuse." In a rather clever design, the relay system is coupled to an input-mute circuit that activates before the output relays, so they don't have to break high current, thus extending relay life.

Nuts 'n' bolts

The general standard of construction in this price range has improved considerably within the last few years, and the NAD 216 and 214's build quality is right up there with its competition. The front panels are uncluttered, with just a power switch and LED indicators for power, soft-clipping, and bridging. Soft-clipping and bridging are engaged by two slide switches on the back.

The interior of each amplifier is dominated by a large, centrally located toroidal transformer. The left- and right-channel circuits are laid out on separate printed circuit boards in a mirror-image format.

Apparently in compliance with safety regulations, the speaker binding posts are covered with a hinged plastic box

that has a slit for speaker cables. However, the slit is so narrow that it is virtually impossible to use anything but the thinnest of speaker cables with the box fastened in place. Fortunately, the box can be partially detached, although the manual dutifully warns the user to re-attach it when the hookup is complete. NAD is the only amplifier company I've seen that uses this arrangement, and I wonder if there's a less clumsy way of ensuring safety. The binding posts themselves are the 5-way variety and seem sturdy.

Sound

Although the main purpose of this review is to evaluate the amplifiers in the context of a home-theater system, sound is sound and amplifiers are amplifiers. (Followers of digital controversies please note: I didn't say "bits is bits.") When evaluating an amplifier for home theater, I first put it through its paces in my Numero Uno System, a stereo audio-only system of much higher resolution than my home-theater system (see the sidebar in the Carver TFM-35x review in this issue for details). If an amplifier does well here, it's certain to do well in any other less-demanding application.

Listening to the 216 in my stereo system, the first thing I wrote down in the *Official Stereophile Reviewer's Notebook* was "typically solid-state." The sound is clean, bright, and lively with clearly defined bass and sharp images in a soundstage of moderate depth. During a three-week break-in period, the brightness was ameliorated but did not disappear completely.

Compared to high-end references, such as the Rowland Model 2, YBA-1 Alpha, or the Bryston 7B-ST, the NAD 216 sounds more forward, not as grain-free, and it has a rougher edge in the treble range. I made an explicit comparison with a pair of Bryston 7B-STs, matching levels within ± 0.1 dB. The Brystons exhibit more fine detail, better delineation of depth, more natural timbres, and much tighter bass. Although this comparison places the 216's performance in a larger audiophile context, it is probably not the most useful that could be made: A pair of Bryston 7B-ST monoblocks costs \$4395, compared to \$699 for the NAD 216. (The Rowland Model 2 and the YBA-1 Alpha are even more expensive.)

Closer to the 216's price range is the Chiro C-200 (\$998), which I reviewed very favorably in the Spring 1996 *SGHT* (Vol. 2 No. 1). I did some

NAD 216 THX

Comments:

The frequency response, signal/noise ratio, and distortion results were all excellent. Crosstalk was very good to excellent.

Measurements:

Clipping (1% THD+noise at 1 kHz): 161 Wpc into 8 Ω , both channels driven; 251 Wpc into 4 Ω , both channels driven; and 465W into 2 Ω , one channel driven. Clipping in bridged mode, 510W into 8 Ω (also at 1 kHz, 1% THD+noise). —TJN

NAD 214

Comments:

The frequency response, signal/noise ratio, and distortion results were all excellent. Crosstalk was very good to excellent.

Measurements:

Clipping (1% THD+noise at 1 kHz): 110 Wpc into 8 Ω , both channels driven; 167 Wpc into 4 Ω , both channels driven; and 293W into 2 Ω , one channel driven. Clipping in bridged mode, 340W into 8 Ω (also at 1kHz, 1%THD+noise). —TJN

matched-level comparisons, and the NAD came up short again. With the NAD, the massed trumpets in the "Winter Wonderland" track of *Big Band Basic* (Reference Recordings RR-63 CD) do not lack punch or excitement, but the band as a whole sounds rougher, and I had some trouble focusing on individual instruments. With the Chiro, the trumpets maintain that exciting "screaming" quality, but there is less of an electronic overlay, and each instrument seems more distinct and natural.

Next, I compared the 216 to the Carver TFM-35x (\$899). Although the NAD sounds a bit more dynamic and its bass is slightly better defined, the Carver has a smooth upper-midrange that's easier on the ears, particularly with recordings that are themselves forward and tend toward harshness. Plácido Domingo's voice on the new recording of *Man of La Mancha* (Sony SK 46436) sounds edgy and artificial through the NAD, but it becomes rounder, more mellow, and more natural-sounding through the Carver.

While both the Chiro C-200 and Carver TFM-35x are in the audiophile entry-level price range, they are still significantly more expensive than the NAD 216. I had no amplifier around that was strictly equivalent to the 216 in price, but I did have the Rotel RB-985 (review in *SGHT* Vol. 2 No. 1), which is a 5-channel amplifier that lists for \$1000, so it actually costs less than the 216 or 214 on a per-channel basis.

I hooked up two of the RB-985's channels and performed matched-level comparisons with the NAD 216. This time it was a closer contest, but I must give the nod to the Rotel, whose deficiencies are more subtractive and not annoying. (Bass extension, dynamics, and resolution of detail all fell somewhat short of high-end references.) On the other hand, the NAD has greater dynamic punch, but it's more in-your-face.

The NAD 214 might be considered as a lower-powered, lower-priced version of the 216, and the two amplifiers sound quite similar, as you might expect. The 214 provides 2 dBW less power than the 216 (80W vs. 125W), and it's not THX certified, but I actually pre-

fer it to the 216 in terms of overall sound quality, due in large part to a little less of that upper-midrange hardness.

Sound and vision

Some of my colleagues at *Stereophile Guide to Home Theater* might disagree, but I find that, once a certain level of performance is attained, sound quality in a video-oriented home-theater system is less critical than in a music-only system. Some amplifiers exhibit a sound quality that wouldn't satisfy me in my music system, but they would be fine in a home-theater context. The caveat here is that I'm fortunate enough to have two separate systems; it may well be that if my home-theater system had to serve video *and* music, I'd be a lot more picky about home-theater sound.

The NAD 216 generally made a better impression in my home-theater system than in my audio-only system. (One 216 was set up to drive the front speakers, another to drive the center, and a 214 brought up the rear.) The amps provide apparently effortless power, doing full justice to soundtracks played at THX reference level (which is LOUD). Dialog is clear and well-focused, as are sound effects. However, I am not completely satisfied with the sound of music reproduced through the NAD amplifiers. Alan Silvestri's main theme for *Forrest Gump* is a lovely tune that plays a major role in establishing the mood for the movie and the character. In the opening feather-floating-in-the-breeze sequence, the tune is first played by a piano, underscored by strings; then it's taken up by the entire orchestra, with the strings dominating. With the NAD amplifiers, the piano has a

nice "tinkly" quality, but when the strings come in, the sound is harsher and more forward than I had expected.

Listening to music on other laserdiscs, and comparing the NADs with the Chiro C-200/C-300 and a set of Carver TFM-35xs, confirm this initial impression. The Chiros and Carvers are able to present music in a smoother, more subtle manner that is simply more listenable. I also prefer the sound of the Rotel RB-985 for much the same reasons.

Bottom-line time

The NAD 216 THX is well-built, it offers a lot of power for \$699, and it generally sounds clean and dynamic. However, in a high-end stereo-only system and, to a lesser extent, in a moderately-priced home theater system, I found it difficult to warm up to the 216's upper midrange/treble, which has a somewhat hard, grainy character that makes reproduced music sound too obviously artificial.

Although a system's ability to sound like the real thing remains the Holy Grail of audio—unobtainable even with the finest components—I feel that some of the NAD 216's competition, including the Chiro C-200 (\$995), Carver TFM-35x (\$899), and even the Rotel RB-985 (\$1000 for five channels) approach that goal more closely.

My assessment of the NAD 214 is considerably more positive. While it's not as powerful as the 216, it still has a fair amount of muscle, it costs much less (\$449), and—most important—it sounds significantly better. Of the two NAD amps, it's the one I would recommend.

SGHT



NAD 216 THX back panel

DENON AVR-1200

AUDIO/VIDEO RECEIVER

Wes Phillips

Someone by the name of Valentino J. Zeek once said, "The key to flexibility is indecision." The man's right. All too frequently, the number of options is inversely proportional to the certainty of the designer as to precisely what he or she is designing. While this is as true in audio/video components as it is elsewhere, there's still a lot to be said for having choices—that is, if they have been intelligently...er...chosen.

Designing an A/V receiver has got to

be a no-win situation. It must do *everything*: accept a variety of sources, decode matrixed surround signals, receive AM/FM radio, serve as a switching center for both audio and video, and drive at least five channels worth of speakers. And as if that weren't complex enough, it must be designed to fit a certain price point; in the more affordable brackets, I imagine that

one starts with a basic design and simply throws away functions until the target price point is reached.

The Denon AVR-1200 is an excellent case in point. At a suggested list price of \$549, it falls firmly into the "affordable" category, which means it cannot offer the final word in power, inputs, or features; after all, there's only

so much you can do on a tight budget. However, the design team at Denon has clearly thought very hard about what the A/V consumer really needs—both now and in the future—and focused on that. By and large, they done good.

Hard wired

I auditioned the AVR-1200 in my dedicated video room, which is 11 feet wide by 17 feet long by 8 feet high. Source components included a Marantz LD510 laserdisc player and MV610 Hi-Fi VCR. The laserdisc player's digital out was connected to a Sonic Frontiers Ultra-Jitterbug via TosLink, and that, in turn, fed an Assemblage DAC 1. The video monitor was a Toshiba CX35E70 35-inch direct-view set.

The speakers were Acarian Systems' Alón Petites (L&R), C-1s (center and surround), and SW-1 passive subwoofer (see my review in this issue). It could be argued that the Alóns are a little pricey for a \$549 receiver, but I know them well and they are quite revealing. StraightWire Symphony interconnects and Quartet speaker cables connected everything. Transparent Cable's Power Link Reference HPAV filtered the A/C.

I lost it at the movies

I enjoyed listening to music using the Denon as a stereo receiver. The tonal balance is somewhat lean, but music sounds lively and robust. However, I

Denon AVR-1200

audio/video receiver

Power output: stereo mode, 70 Wpc LCR (20 Hz–20 kHz, 0.08% THD), 15 Wpc surround

THD: 0.08% (front channels, 20 Hz–20 kHz) Audio-only inputs: 1 phono, 4 line-level

Audio outputs: 2 line-level stereo record

Video inputs: 2 composite

Video outputs: 2 composite

Dimensions: 17.09" x 5.59" x 11.94" (WxHxD)

Weight: 8.8 kg

Ser. #: 8404942

Price: \$549

Distributor:

Denon Electronics

222 New Rd.

Parsippany, NJ 07054

tel. (201) 575-7810

fax (201) 808-1608



cannot comprehend why audio companies insist on loading processors with crappy-sounding artificial ambience effects. The Denon has five (Concert Hall, Live, Rock, Jazz Club, and Mono Movie), in addition to Dolby Pro Logic, and I can't abide any of them. Concert Hall sounds like you're playing music down a pipe, and the others are less extreme variants of that basic sound. Mono Movie, in which "a sense of expansion is added to monaural sources" (according to the manual), sounds like a good idea to me, since I watch a lot of old films. But it just gave me a headache, so I stuck to plain old mono.

Denon's not alone in this. Just about every manufacturer offers these effects, and they all suck, not to put too fine a point on it. When I sold audio/video gear, we salespeople quickly learned not to demo these processor settings for customers because they'd invariably ask, "What happened to the music?" We'd just mention the "options," playing them only under duress. Can't the companies that make these things hear how bad they sound?

Otherwise, the AVR-1200 is a pleasure, and an unexpected one at that. To begin with, the video switcher is of very high quality. I compared laser-discs going directly into my monitor with the same signal passed through the Denon's input, and I was

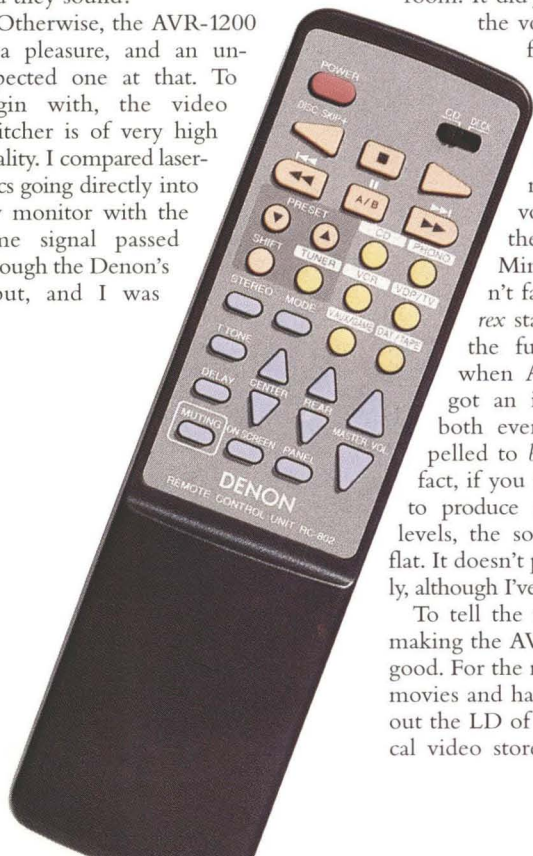
surprised to find the signal virtually unaffected. It was just a smidge darker, but the signal was clean and amazingly detailed.

I also enjoyed watching and listening to movies through it. A lot. I suspect that the 70W front-channel rating is a bit optimistic, but I must admit that I was amazed by the control that the Denon exerted over the Alóns and their passive subwoofer. I could make that puppy moan rather than arf, but I had to launch a rocket or blow up something *big* in order to do so. In all fairness, however, the 1200 will probably be used with a powered subwoofer, which will put a lot less strain on the front channels than the Alón setup.

Dialog is clear and comprehensible, and all the telling details that the Foley artists worked so hard to create are audible and believable. In addition, the 20W surround channels do a fine job of projecting ambient details, which surprised the dickens out of me.

You don't want to turn the AVR-1200 up too loud or use it in a really large room. It did just fine in my room at the volume I enjoy, but I am frequently accused (by everyone but my wife, of course) of listening at very low levels. Realizing this, I watched many films at a higher volume than usual, and the Denon did just fine. Mind you, the pictures didn't fall off the walls when *T. rex* stalked the earth, nor did the furniture get rearranged when Apollo 13 blasted off. I got an idea of the majesty of both events, but I wasn't compelled to *believe* on a gut level. In fact, if you try and force the receiver to produce massive sound-pressure levels, the sound becomes hard and flat. It doesn't poop out all that gracefully, although I've heard a lot worse.

To tell the truth, I had to work at making the AVR-1200 sound less than good. For the most part, I just watched movies and had a fine time. I checked out the LD of *First Knight* from my local video store, thinking it would be



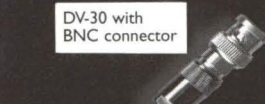
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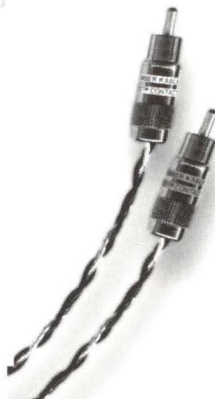
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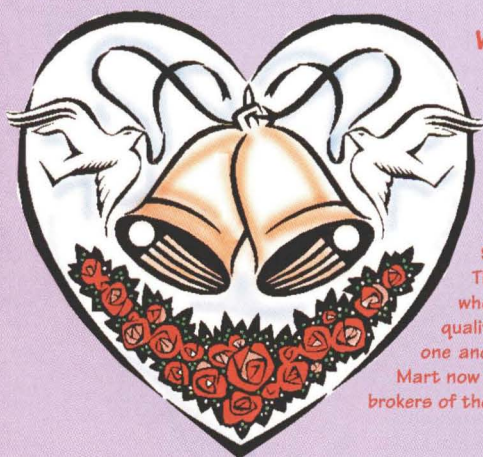
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good for a giggle after it was so soundly panned, and found myself caught up in that old familiar story. Caught up? More like enveloped.

As an ardent admirer of Jane Austen, I couldn't resist *Clueless*, which purports to have been based on *Emma* (a connection that was not at all obvious to me). Nonetheless, it proved a delight: sharp social satire with a delightful tongue-in-cheek loopiness. And it's filled with telling details, both visual and aural, that rush past incredibly quickly.

In spite of my picky nature and the compromises made by pricing necessity, I essentially forgot about the AVR-1200. I went to Camelot, L.A., and out into the galaxy. I had adventures, and I followed some slackers around Austin. I rate that a success.

Duram est omnibus placere

I wanted to feature what I like about the AVR-1200 up front because I consider those qualities to be primary. However, I have quite a few little niggling complaints that I really *must* make, even though they don't affect my admiration for what the Denon gets right. Many of these complaints are not unique to the 1200 but are rampant among affordable A/V gear. Some of this reflects the necessities of the price/performance compromise, but I suspect that much of it reflects a pack mentality among manufacturers. The company that gets the details right stands to be one honking winner in the consumer-electronics biz, so why is everybody just offering the same old same old?

One of the areas in which cost-conscious compromise is immediately apparent is in the input bank, which accepts only two audio/video inputs (labeled VDP/TV and VCR) and five audio-only inputs (phono, CD, VDP/TV, VCR, and DAT/Tape). There are two tape outputs (labeled VCR and DAT/Tape) and two video outs (labeled monitor and VCR). All video connections are composite; S-video is not offered.

At first blush, this might seem like a multitude of choices, but if you start counting the pieces of gear in your system right now—not even taking future

purchases, such as a DVD player, into consideration—you'll quickly realize that these connections don't give you a lot of flexibility. As much as I *personally* enjoy records, I must question whether the money spent on an RIAA phono section would be better allocated for an additional set of line-level audio inputs and at least one more video-source input.

Speaker connections are another area in which cost constraints dictate difficult choices. The AVR-1200 includes binding posts for two stereo pairs (local and remote), but the center and rear channels must make do with spring-loaded "guillotine" connectors. These do not provide a secure connection and are sonically inferior. Yet team Denon had a difficult choice here. Most of my friends have more than one pair of speakers, and they expect their amplifier—even an affordable one—to let them play both sets. Denon could have eliminated one primary pair of speaker outputs to please purist types like me, but I suspect their market research has already told them what a dead-end *that* would be. Deltron connectors, which take banana plugs, are inexpensive and compact, and they make much better contact than junky spring clips. They are widely found on budget gear in the UK; why not here?

The AVR-1200 does have pre-out jacks for the center channel and a subwoofer, which makes sense. It would make even more sense if the company had included a pair for the rear channels as well. This would allow the receiver to be used as a processor/pre-amp and power amp for the left and right channels, enabling consumers to use the AVR-1200 as a stepping stone toward a separates-based system. Completing the rear-panel array is a pair of

**To tell the truth,
I had to work at
making the
AVR-1200 sound
less than good.**

convenience power outlets and radio-antenna connectors for 75Ω coaxial cable and an AM loop antenna.

The 1200 has a couple of features that I didn't notice at first, but which I consider nearly indispensable: onscreen display and Personal Memory Plus. "How do you miss onscreen display?" I hear you asking. Actually, I didn't exactly *miss* it; I used it constantly and found it helpful and well thought-out. I've come to expect it from the separates I customarily use. But the processor/pre-amp I normally use costs nearly twice the price of the AVR-1200—onscreen display is a rarity for a \$549 receiver.

The Personal Memory Plus option stores the surround mode chosen for each input. I didn't notice this feature immediately because I used the 1200 in my dedicated home theater primarily for watching films. That's fine, as far as it goes, but most folks are going to press this baby into use for *everything*, which means there's going to be a lot of source switching going on. PMP means that you only have to set your preferences once, not every time you switch. This is so obvious and necessary that one has to wonder why everybody doesn't do it.

The remote control is small and eas-

ily held, and it can also control Denon CD players and cassette decks. It cannot engage or mute either pair of primary speakers separately—that must be done at the front panel—but it does let you switch sources, select surround modes, adjust separate channel levels, and adjust the system gain level. Even though each set of buttons is differently shaped so they can be more easily distinguished by function, I kept switching to the phono input when I meant to select the laserdisc player.

There's a price to be paid for the remote's compact size: The buttons are small and their labels are hard to read. On the plus side, the master volume buttons are larger and easily located, even in the dark. The fluorescent front-panel display is clearly laid out, but it has small print that is difficult to read from across the room, even in the dark.

A man's gotta dream

I don't think manufacturers can continue to offer only two video inputs; these days we all demand more. Nor do I think that people should have to accept flimsy spring-type speaker connections just because they don't have a lot of money. We deserve better. And frankly, I don't know anybody who likes *any* of the fake, echo-laden "surround-modes"—hey guys, they're *losers*, so junk 'em.

Having said that, there's not much *not* to like about the Denon AVR-1200. At \$549, it's a steal; I've not heard its equal for the money. I found it reliable and enjoyable. At *Stereophile*, every reviewer must ultimately answer the big question: Would I spend my own money on the product? I find that question easy to answer regarding the AVR-1200: Heck yes, in a New York minute. **SGHT**

Comments:

The distortion and channel separation measured good to very good in the stereo mode, but the frequency response was only fair (the two channels differed, unevenly, by 0.25 dB). Distortion, separation, and frequency response were fair to good in Pro Logic mode. The signal/noise ratio was good except in the surround channels, where it was fair. Channel tracking at different volume settings was only fair.

Measurements:

Clipping (1% THD+noise at 1 kHz): L&R channels only, both channels driven, 82 Wpc into 8Ω, 122 Wpc into 4Ω; center channel driven alone, 152W into 8Ω. Surround channel, both driven, 21 Wpc into 8Ω. Frequency response, surrounds: 3 dB at 6.8 kHz, -8.4 dB at 8 kHz, slightly less extended than Pro Logic standard.

—TJN

ONKYO TX-SV727

AUDIO/VIDEO RECEIVER

Wes Phillips

One of my favorite riffs in *Star Wars* concerns the *Millennium Falcon's* refusal to go into hyperdrive. "Hold on!" Han Solo shouts and... *nothing happens*. Funny stuff, and it certainly heightens the tension.

Well, I'm here to tell you that it's not so funny when it happens to you. My experiences with Onkyo's TX-SV727 A/V receiver reminded me of those scenes, and I'm not laughing at all.

My first encounter with the Onkyo started promisingly enough. It's hefty, which usually indicates real power. Removing it from the shipping carton, I noticed numerous rear-panel RCA connectors, which bespoke flexibility. I connected my source components, video monitor, and speakers, popped a laserdisc into my player, powered up the 727, pressed the remote control's volume button, and...

Nothing happened. I tried switching sources and the receiver obliged, but still no sound. I tried the volume control again, but there was no action on the part of the receiver's motorized volume knob and no sound, either. I walked over to the receiver and turned the knob. It turned, but still no sound.

Finally, after calling up every on-screen display I could—and punching every combination of buttons on the remote—I sussed out that the Tape-2 Monitor switch was engaged. Turning

it off gave me sound, but still no remote control over the volume. During my five-minute button-pushing marathon, I had determined that every other remote-control function worked. Only the one I (and everyone else) use the most was inoperative.

Since this occurred on a Friday evening, I went ahead and watched several films, jumping up every time I needed to change loudness. It's amazing how quickly we get spoiled, ain't it?

Meanwhile, back at the ranch...

While we're waiting for the Onkyo folks to get back from the weekend, let's take a look at the TX-SV727. As I already mentioned, it's a chunky receiver, weighing in at 28½ pounds. In stereo mode, it generates 100 Wpc; in Pro Logic, it puts 80 watts into the LCRs and 25 into each surround speaker. The back panel includes RCA inputs for four audio sources (phono, CD, Tape 1, Tape 2/Monitor) and three A/V sources (Video 1, Video 2, and Video 3). A forth A/V input labeled Video 4/aux is located on the front panel.

The output complement includes audio record outs for Tape 1 and Tape 2 as well as A/V record outs for Video 2 and Video 3. There is one video-monitor output jack, which—like all the video connections—is composite RCA. There are pre-out jacks for the front, center, rear, and sub-woofer channels as well as a pair that can be used to feed a remote, multiroom system.

The rear panel also includes a switch labeled IPM, which stands for "Intelligent Power Management." Setting the IPM switch to On (TV) causes the

Onkyo TX-SV727

audio/video receiver

Power output: stereo mode, 100 Wpc into 8Ω (20 Hz–20 kHz, both channels driven); Pro Logic mode, 80 Wpc (LCR), 25 Wpc (surround)

THD: 0.08% (front channels @ rated power, 20 Hz–20 kHz)

Audio-only inputs:

1 phono, 4 line-level

Audio outputs: 4 line-level record, 8 pre-out (multi-source, front, center, rear, and subwoofer)

Video inputs: 4 composite

Video outputs:

2 record, 1 monitor out (all composite)

Dimensions: 18" by 6.69" x 15.31" (WxHxD)

Weight: 28.7 lbs.

Price: \$750

Distributor:

Onkyo U.S.A. Corporation
200 Williams Drive
Ramsey, NJ 07446
tel. (201) 825-7950
fax (201) 825-8150





receiver to monitor the Video 1 input jacks for a signal. When a signal is sensed, the receiver automatically powers up and switches to Video 1. Assuming you have a TV connected to the Video 1 input, IPM ensures that you (or a long-suffering family member) will have audio each and every time you turn the TV on.

Post-type speaker connectors accept banana plugs or bare wire for all channels, including a second stereo pair (intended for remote locations). AM and FM antenna inputs, wired-remote linkages, and three AC convenience outlets complete the rear-panel provisions.

All control functions can be accessed from the front panel in case your remote fails. Dedicated knobs for balance, bass, and treble are a welcome sight, as is the headphone jack. (It's the first one I've seen lately, and it's a godsend to those of us who stay up later than our current lifetime companions.)

The learning remote is jammed with buttons—all small, all the same size and shape. You can teach it to control CD players, tape decks, VCRs, televisions, cable boxes, whatever. This remote would be very awkward to use in the dark if not for one *very* savvy feature: The most significant controls (power, volume, surround mode, and TV/VCR) are located on a fluorescent back-ground. If you remember to leave the remote in the light—and not stuck between the sofa cushions, where

mine always ends up—the background glows dimly, highlighting the basic control groups. It works very well.

However, the front-panel display is another story. With the exception of the relatively large source indicators, I found it difficult to read the display from across the room. Fortunately, the 727 offers onscreen legends, which I took advantage of constantly.

Monday, Monday

Monday finally arrived. *No problem*, I figured, *I'll just do what any consumer would and call customer service. That's what they're there for.* Naturally, I couldn't get through to a human being, but I left my name in voice-mail hell and played phone tag with the service department until the next day. (This was more my fault and the time difference between N.M. and N.J. than indifference on the part of Onkyo; they *did* try to get back to me.)

I finally got through to a customer service representative and explained who I was, what I was writing, and what my problem was. "It's probably the remote," was his response, "just take it back to your dealer and he'll give you a new one."

"I don't have a dealer. I'm a reviewer for *Stereophile Guide to Home Theater*. I'm writing about this receiver for the next issue and I have a deadline of yesterday."

"I can't help you. You'll have to talk to the parts department. I'll transfer you."

Parts had remotes, but since I didn't have an account, I also had a problem. They gave me another number to call, which didn't answer. I wimped out. Bureaucracy 1; Wes 0.

Upon hearing my plight, Editor Lawrence Ullman gave me a magic name. A quick phone call to Nicoll PR, Onkyo's public relations agency, produced a new remote two days later. I loaded batteries into it, pointed it at the 727, and...

Nothing happened. I called Onkyo in a sweat and got another Parts person. "Why would they assume it was the remote control?" he asked rhetorically.

"I wondered about that," I responded. "All the other functions work fine."

"Sounds to me like a wire harness got jostled off the circuit board..."

"That I can fix. Where is it?"

Five minutes later, having determined that everything connected to the circuit board was firmly affixed, I was back on the phone to Onkyo. "Looks



like we'll have to ship you a new receiver. Sure wish we had one."

"WHAT!?!?"

"I think there's one in the display case in the lobby. We could probably send that one."

"Maybe you could check it first."

"You might find this hard to believe at the moment, but we check *all* of them before they go out of here."

Meanwhile, back at the ranch...

While we're waiting for that new receiver to show up, I should probably mention the system I auditioned it in. My dedicated video room is 11-feet wide by 17-feet long by 8-feet high. A Marantz LD510 laserdisc player and MV610 HiFi VCR served as the video sources. The laserdisc player's digital out was connected to a Sonic Frontiers UltraJitterbug via TosLink feeding an Assemblage DAC 1, which makes the LD player a pretty good CD source to boot. Toshiba's CX35E70 35-inch direct-view monitor and Acarian System's Alon Petites (front left and right), C-1s (center and rear), and SW-1 passive subwoofer completed the system (see review in this issue). StraightWire Symphony interconnects and Quartet speaker cables strung everything together. Transparent Cable's Power Link Reference HPAV filtered the AC.

Ranking work above virtues

The 727 is impressive in many ways. With an unusual amount of power for the sub-\$1000 class, it really took control of my speakers, especially the SW-1 passive subwoofer. The very low tones of the pyramid/spaceship's motors in *StarGate* were thunderous, as were deep

bass-guitar notes and big drum thwacks when I played music through the system. Dialog was cleanly rendered and the surrounds disappeared completely, throwing effects into the room itself.

But listening to music through the Onkyo—or rather comparing stereo and surround-decoded versions of the same material—reveals that the Onkyo's processor is quite colored. Activating the processor subjects everything to a timbre shift: sounds get chestier—not muffled, but sounding lower in the sonic spectrum. For example, violas darken toward the cello region. In addition, the leading edges of tones soften substantially.

This is not always unpleasant. Santana's *Abraxas* has been marvelously remastered by Mobile Fidelity (UDCD 552 CD) and seems the perfect candidate for surround-sound listening. It opens with an atmospheric work, "Singing Winds, Crying Beasts," which is filled with sighing breezes and tinkling bells. Santana shrieks in on distorted guitar and the conga players work themselves into a frenzy.

As the piece started through the 727, I loved the way the winds decoded into the center of the room; if they didn't actually caress the hairs on my arms, they certainly made those hairs stand on end. However, when Carlos comes in, riding one of the earliest Mesa Boogie amps (number 5, I'm told), it sounds blunted where it should sound sharp and insistent. And the drums are swamped in generic reverb—mushy, not crisp and ringing.

I used Telarc's sampler *Surround Sounds* (CD-80447 CD) and a variety of other sources, encoded and straight stereo, and never preferred the pro-

cessed sound. Information was missing, timbre was changed.

This wasn't as noticeable during movies, which is probably a reflection of how much brain processing is occupied by the optic nerve. Speaking of optics, the Onkyo's video switcher darkens the picture and blunts details, much as the processor does to the sound. While brightly lit scenes do not suffer unduly from this, dark ones—or scenes that rely on low-level contrast—do. This makes it more difficult to read small print, such as technical credits. My monitor accepts three video sources, so I could bypass the Onkyo's video switcher, but why should I have to?

Nobody's perfect

The Onkyo TX-SV727 is extremely well thought-out. It boasts sufficient inputs for most modest home theaters as well as some thoughtful options for future expansion. Despite the large number of small, identically shaped buttons on the remote control, I found it simple to operate and not at all confusing, thanks to the innovative glow-in-the-dark background behind the most-used functions.

However, I'm concerned about quality control. If I had been an ordinary consumer, I could have taken the first defective unit back to my retailer and received an immediate replacement, which is as it should be. Most of my misadventures occurred because I was outside the normal dealer/consumer loop, but they did give me pause. Ultimately, however, the TX-SV727's surround processor's sonic colorations are just too conspicuous to ignore. As much as I like its features and intelligent layout, I couldn't live with it. **SGHT**

Comments

The distortion, separation, and frequency response ranged from good to very good in the stereo mode, fair to good in Pro Logic. The signal/noise ratio was good in stereo, fair in Pro Logic.

Measurements

Clipping (1% THD+noise at 1 kHz): L&R channels only, both channels driven, 122 Wpc into 8Ω, 177 Wpc into 4Ω; center channel driven alone, 158W into 8Ω. A single surround amplifier drives the surround loudspeakers in series; measured clipping in the surrounds was 29W at each surround loudspeaker terminal, both surround outputs driven, each loaded with 8Ω. Frequency response, surrounds: -5.2 dB at 8 kHz, slightly less extended than Pro Logic standard.

—TJN

PIONEER ELITE CLD-79

LASERDISC PLAYER

Thomas J. Norton

Occupying the middle of Pioneer's Elite line of laserdisc players, the CLD-79 is considerably less expensive than the top-of-the-line CLD-99 [reviewed by J. Gordon Holt in our Spring 1996 issue, Vol. 2 No. 1—Ed.]. Except for its high-gloss front panel and a slightly different control layout, the 79 strongly resembles the CLD-D704, the top model in Pioneer's standard laserdisc lineup.

The CLD-79 lacks the CLD-99's polished-wood end panels, but it is functionally quite similar to both the CLD-99 and the CLD-D704. There are a few trick features—one-shot memory and still with sound playback to name two—that are best left to gadget freaks. Beyond that, however, all the features normally expected in a high-end laserdisc player are here.

In addition to two-sided playback, you get a full suite of digital processing to provide special effects on CAV and CLV discs as well as freeze-frame, video jitter reduction, and the usual search, repeat, and programming modes. The back panel boasts an AC-3 RF output as well as TosLink (optical) and coaxial digital outputs; finding both on a laserdisc player is increasingly rare these days.

The remote is illuminated and includes a jog/shuttle dial. The main unit includes a separate CD drawer along with a CD Direct mode that shuts down the video circuitry for (theoretically) better sound on music playback.

A separate Movie mode squelches the front-panel display, blackens the screen on side changes, and *very slightly* speeds up those changes.

As with the CLD-D704 and CLD-99, the CLD-79 is equipped with a defeatable video noise-reduction system that includes separately adjustable parameters for luminance (Y) and color (C). Three user memories are provided for these settings, along with a standard (factory) setting.

The presence of these separate controls indicates that the video in the CLD-79 (and CLD-D704 and CLD-99) is "S-processed." That is, the signal is separated into its Y and C components, noise filtered, then fed directly to the S-video outputs or reassembled into composite form for the composite output. This suggests that it might be best to use the S-video output, thus avoiding two additional signal processing steps (Y-C to composite in the player and composite to Y-C in the video monitor).

However, my experience indicates that there is no obvious difference in the picture quality between the composite and S-video outputs when used

Pioneer Elite CLD-79

Combi-LD player with remote

Frequency response: 4 Hz–20 kHz (no tolerance specified)

S/N ratio: 115 dB

THD: 0.0025%

Outputs:

2 S-Video

(with 3-line, digital Y-C

separation circuit), 2

composite video, 2 L&R

Audio, TosLink

digital, coaxial digital, AC-3 RF, control out, control in

Dimensions: 5.5" x 16.6" x 17" (HxWxD)

Weight: 19.2 lbs.

Ser.#: P13904970 EM

Price: \$1440

Pioneer Electronics (USA) Inc.
P.O. Box 1540
Long Beach, CA 90810-1540
tel. (213) PIONEER



with monitors that have a high-quality comb filter. (The separation circuits that feed the CLD-79's S-video output include a 3-line digital comb filter that is likely to be of better quality than the one found in most consumer TVs.) I used the standard setting for video noise reduction in all of my testing; the changes from fiddling with the controls were quite subtle.

My sole complaint about the functionality and features of the CLD-79 concerns the layout of the remote control. It looks the same as the remote for the CLD-D704 (with which I am intimately familiar), but certain key controls are in different locations. I kept pushing the wrong buttons—for example, stopping the machine when I simply wanted to back up a chapter.

This was irritating, but it's just part of getting used to *any* new machine. Still, why did Pioneer feel the need to organize the buttons differently on this player (and, as I recall, on the CLD-99 as well) than on the standard series, especially since many new Elite owners will be moving up from less expensive Pioneer LD players?

System and setup

For all my laserdisc player reviews in this issue, I was fortunate to have the Runco IDP-980 Super IDTV II projector and

SC-3050 Super IDTV II scan converter, which were reviewed in our previous issue (Summer 1996, Vol. 2 No. 2). I also used the Mitsubishi VS-6085 Diamond-series 60-inch PTV reviewed elsewhere in this issue. However, all my substantive observations are based on the Runco with a 7-foot wide, 16:9 aspect ratio, Stewart StudioTek 130 screen.

Most of the program material I used was film-based and letterboxed. The 4:3 material was just under 63 inches wide on the same 47-inch-high screen. For most of the evaluation, the signal passed through the video-switching circuits of a Proceed PAV surround processor on its way to the scan converter/projector. Some switching was also done directly from the inputs of the scan converter to verify the observations made through the PAV. Unless otherwise noted, all video connections were composite using identical cables, from the output of the CLD-79 to the input of the scan converter (or directly to the monitor in the case of the Mitsubishi PTV).

All comparisons with other players were made using two copies of the laserdisc in question, cueing them in sync (or slightly out of sync for successive viewing of the same material on each machine), and switching between them from the PAV or the scan converter. When multiple inputs on the latter device were used, both were adjusted identically. The inputs were also reversed to ensure that subtle variations in the inputs themselves were not responsible for any observed differences. (This did not prove to be a problem with this particular equipment.)

The audio side of my home-theater system consisted of the aforementioned

Proceed PAV surround processor (sometimes supplanted by the Angstrom 200 or Meridian 565 under review for this issue), a Carver AV-806x multi-channel power amplifier, Triad Gold LCR loudspeakers, Velodyne ULD-18THX subwoofer, and either the KEF Reference AV2 or Citation Model 7.3 Dual Drive dipole surrounds. Cabling included XLO/VDO interconnects and front loudspeaker cables, with in-wall Monster cables feeding the surrounds.

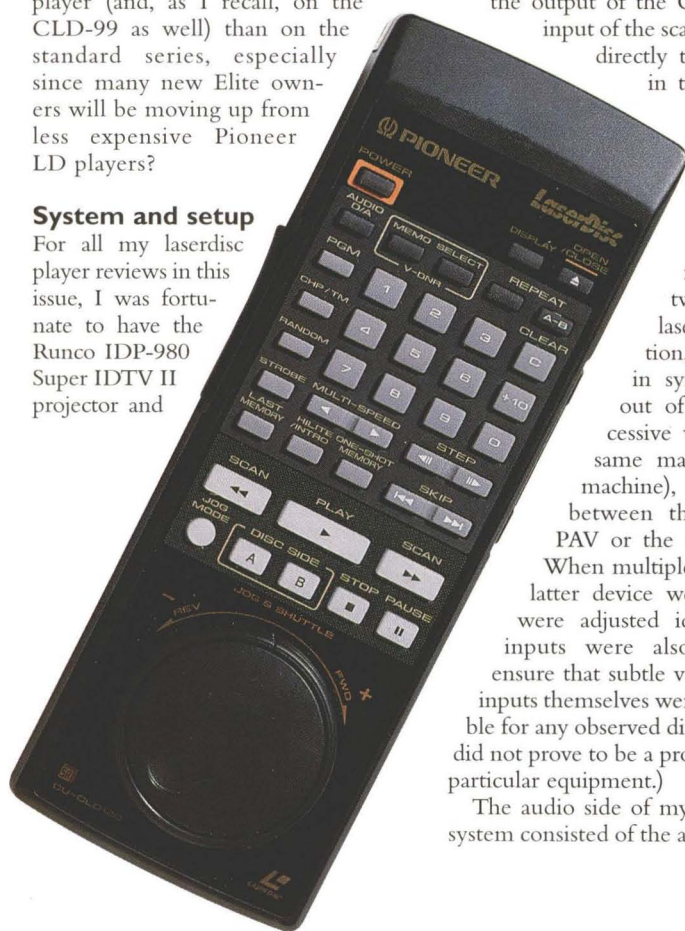
What more could you want?

The picture from the CLD-79 is stunning. Even on the big screen, sharp laserdiscs are crisp-looking, although not every scene on every disc is sharp, of course. Variations in transfer quality and original photography are presented in sharp relief, as are the natural limitations of NTSC.

While full-screen images can be startling in their clarity, small details are not always as well served. This is no reflection on the CLD-79, only a limitation of the source or the system. Perhaps DVD will improve this slightly, but it might take HDTV—if we ever get it—to substantially improve on this situation. Nevertheless, from the crisp, detailed jungle images of *Congo* to the dark but finely-shaded scenes in *Crimson Tide*, feed the CLD-79 a great-looking laserdisc, hook up a first-rate video display, and you'll get a picture worth shouting about.

The only laserdisc player I have seen that may be better than the CLD-79 in some respects is last year's CLD-97. I did not have a 97 on hand for comparison, but it is more ruggedly built than the current crop of players, and it may also be the all-time champion for low video noise. (I would also make the same comment on the CLD-97 vis-à-vis the CLD-99). But video noise was *not* a problem with the CLD-79, and in other important respects—particularly sharpness—the CLD-79 is arguably superior.

Sonically, I had no complaints, either. The CLD-79 uses Pioneer's "Legato Link" system, which is said to synthesize high-frequency harmonics



well above the natural limits of the CD format. (This is a drastically simplified explanation, but it relates the general idea.) I can't honestly say whether this had anything to do with what I heard, which was an open, detailed, nonirritating quality on the best laserdiscs.

While good outboard D/A converters sound a little sweeter (I used the digital inputs of the Meridian and Angstrom processors), I felt little need to upgrade to a better outboard DAC when I listened to the CLD-79 by itself. If you wish to do so, the two digital outputs on the unit offer that opportunity. (I recommend the use of the coaxial output whenever possible.)

Elsewhere in this issue, Bob Harley discusses outboard D/A converters and how they can improve the sound of your home-theater system. With a laserdisc player of the quality of the CLD-79, however, I would consider such an upgrade icing on the cake.

The difference in sound between the CLD-79 and, say, the Theta Data III linked to the Theta DS Pro Basic III was more evident on CD playback in my reference audio-only system. This system includes a Jeff Rowland Design Group Consummate preamplifier, Sumo Andromeda III power amplifier, Energy Veritas v2.8 loudspeakers, high-end Cardas Hexlink and TARA Labs Master RSC interconnects and Monster M1.5 loudspeaker cables.

In this context, the CLD-79 is very easy to listen to, with no offensive, edgy qualities. This is definitely the right direction for soundtracks, which are often overly bright. The 79 is also more than competent in soundstage imaging and depth. The Theta combo *was* more open, detailed, and transparent-sounding, with tighter bass, but I nevertheless enjoyed every minute I spent listening to the Pioneer's liquid, dimensional presentation. I would stack it up against any CD-only player I know of selling for under \$1500, confident that it would at least hold its own.

Back in the home-theater system, I compared the video quality of the

CLD-79 closely with the other laserdisc players reviewed in this issue, plus the Marantz LV520 and Pioneer CLD-D704. I discuss the Theta and Yamaha comparisons in those reviews; suffice it to say here that the CLD-79 and CLD-D704 are virtual peas-in-a-pod in terms of performance. The only difference I noted is a slightly higher video gain from the 704. To give you an objective

**I have not yet
seen a machine
capable of
better video
performance.**

feel for the extra video output, the foot-Lambert reading off the Stewart screen decreased by about 17 percent when switching from the CLD-D704 to the CLD-79. This resulted in slightly more saturated colors from the Elite player.

In theory, it should be possible to correct this with a slight readjustment of your set's brightness and/or contrast controls. However, whether or not you can make the two players look identical in this respect depends entirely on the resolution of your set's controls. Because of the color-saturation difference, I marginally preferred the look of the CLD-79, and I was not able to readjust the controls so that my preference was nullified or reversed. However, the degree of the difference was small enough that unit-to-unit production variations might well swamp it.

In all other respects, the two players are identical; there are no visible differences at all in detail, sharpness, or video noise. And while an audio critic risks his or her union card by admitting they heard no differences, I also found the sound quality of the two machines to be identical, which, as noted previously, is very good indeed.

Using the laserdisc *A Video Standard*, I observed approximately 400 lines of horizontal resolution from the CLD-79. [The SMPTE resolution chart on AVS (frame 50789) provides a highly subjective measure of horizontal resolution. In addition to being open to interpretation, the setting of the video display's sharpness control (another subjective item) directly affects apparent resolution. But, as with the Theta, the Pioneer's resolution is exemplary any way you slice it—Ed.]

Changing sides took 12 seconds in normal mode, 10 seconds in film mode. With respect to mechanical noise, it is roughly equivalent to the other players evaluated in this issue and the CLD-D704. The mechanical whirring noise is quite audible in a quiet room, but not a distraction with even a moderately quiet soundtrack. With a CD playing, it is far quieter.

Conclusions

The Pioneer Elite CLD-79 joins the CLD-D704 at the top of the laserdisc player pile. I have not yet seen a machine capable of better video performance, and that includes the Theta Data III reviewed in this issue and the CLD-99 (which I lived with briefly before sending it to JGH for his review). The CLD-99 was compared with the CLD-D704, not the CLD-79, and it was also viewed on the much smaller (but very high quality) 35-inch Toshiba CN35D90. On a bigger screen, it is possible that the CLD-99 would forge ahead of the pack, but nothing I saw from the CLD-79 left me wishing for anything more, short of HDTV or perhaps DVD (if the latter lives up to its promise).

As I have said before, I really believe we have reached the limits of current laserdisc technology with machines such as the CLD-D704 and CLD-79. They appear to be retrieving everything possible from the best current discs. And with DVD on the horizon, I don't see any benefits to be gained by waiting for "better" laserdiscs and laserdisc players. The R&D thrust has shifted to DVD. We can only be thankful that the last serious laserdisc player development has resulted in machines like the CLD-79.

SGHT

THETA DATA III UNIVERSAL TRANSPORT

LASERDISC PLAYER

Thomas J. Norton



Several years ago, when Theta Digital was considering options for their first CD transport, they took a close look at a combi laserdisc player from Philips. Such “out-sourc-

ing” is not unusual. For example, most of the high-end companies that market CD transports base their machines on mechanical parts from the big manufacturers. (The mechanical bits typically require expensive tooling far beyond the resources of a small electronics firm.)

At the time, Theta was not particularly targeting the video market. But the heavy-duty mechanism required by a laserdisc player (LDs weigh much more than CDs and rotate at higher speeds) appealed to the company as possibly conferring stability—

and sonic benefits when used for CD playback. They settled on the Philips LD mechanism and used it to create the Data Universal Transport. Although the Data was targeted at high-end audiophiles, it retained the ability to play laserdiscs, which is an attractive buyer bonus given its high price.

Philips laserdisc players are now history, but the Theta Data lives on, now in its Data III incarnation. Theta currently bases the machine on a Pioneer CLD-D703/D704 mechanism. A cosmetic match to Theta’s new Casablanca surround processor, the Data III is far more robust-looking than the Pioneer players, thanks to its heavy, brushed-aluminum front panel (available in natural aluminum or black finish). It also weighs more than twice as much as the Pioneer units.

Separated at birth?

Featurewise, the Theta is virtually identical to the Pioneer units. You get 2-sided play; a full set of programming functions; digital processing for full special effects with CAV and CLV discs as well as video jitter reduction and freeze-frame during search and side

Theta Data III

Optical disc transport with IR remote
Outputs: 2 S-Video (with 3-line, digital Y-C separation circuit); 2 composite video (one RCA, one BNC); L&R audio, analog tracks only (see text); 3 digital audio (coaxial RCA, coaxial BNC, balanced XLR); AC-3 RF
Dimensions: 6.5" x 19" x 17.7" (HxWxD)
Weight: 40 lbs.
Ser.#: 13271
Price: \$4500
Options: Single-mode optical digital out (\$800), AT&T digital out (\$300)

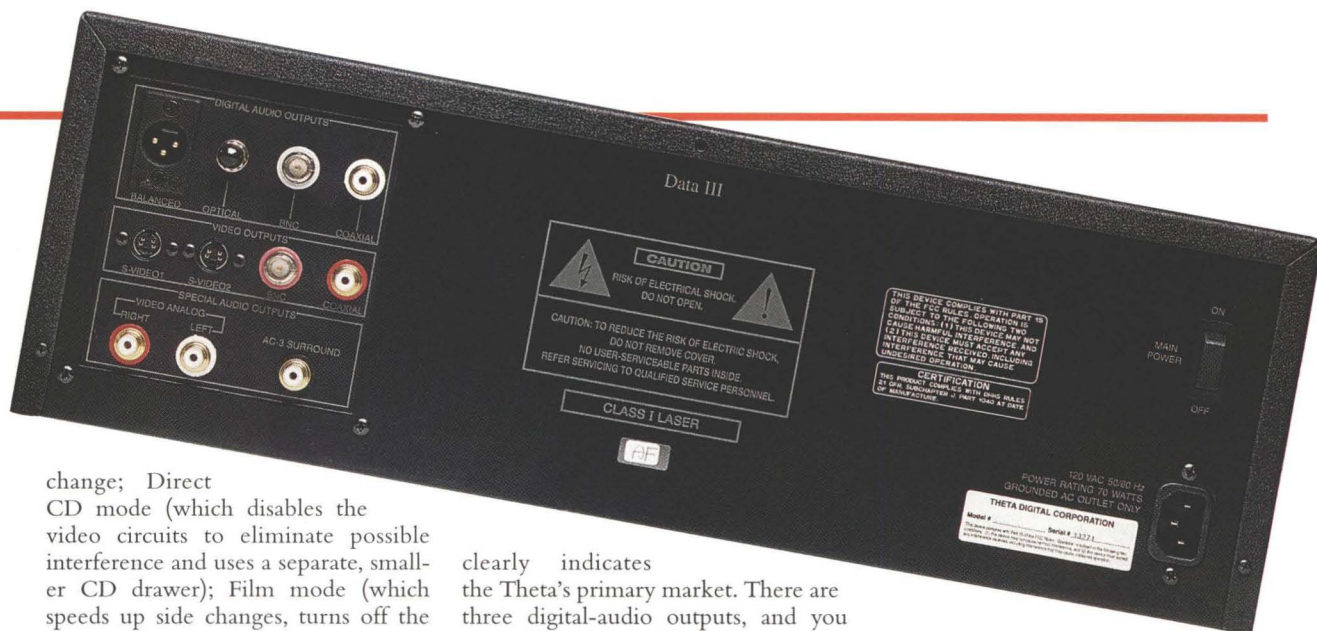
Theta DS Pro Basic III
Digital-to-analog converter

Frequency response: 20 Hz–21 kHz, +0/-0.2 dB
S/N Ratio: 120 dB
THD: 0.002%

Inputs: 2 coaxial, 1 AES/EBU (XLR balanced), 1 TosLink
Outputs: RCA (single ended), XLR (balanced), digital coaxial tape loop
Dimensions: 2.5" x 19" x 11.4" (HxWxD)
Weight: 20 lbs.
Ser.#: 13248
Price: \$2695

Options: Single-mode optical digital out (\$800), AT&T digital out (\$300)
Manufacturer:

Theta Digital Corporation
5330 Derry Avenue, Suite R
Agoura Hills, CA 91301
tel. (818) 597-9195
fax (818) 597-1079



change; Direct CD mode (which disables the video circuits to eliminate possible interference and uses a separate, smaller CD drawer); Film mode (which speeds up side changes, turns off the front-panel display, and presents a black screen instead of a freeze-frame during side changes); and a digital audio-level control. The owner's manual for the Data III could be used to operate the Pioneer CLD-D704 without missing a beat, and vice versa. In addition, the illuminated remote is identical to the Pioneer's, except for the name "Theta" screened onto it.

However, a look at the rear panel of the Data III reveals significant differences with the CLD-D704 and

clearly indicates the Theta's primary market. There are three digital-audio outputs, and you can add an optional AT&T or single-mode optical output at extra cost. (Theta is the only consumer audio manufacturer I know of that uses single-mode optical output.)

The left and right analog outputs provide only the analog audio tracks on a laserdisc. To access a laserdisc's Dolby Surround (not AC-3) digital tracks, you must use an outboard digital-to-analog converter (DAC).

This is understandable if the Data III is to be used primarily as a CD transport. After all, the whole purpose of using a separate transport for CD replay is the opportunity to use an outboard DAC for its (sometimes) superior sound quality.

Since the Data III is based on the Pioneer CLD-D704, I suspect that the Pioneer's original DAC is still present on the Data III's circuit boards and has been either bypassed or disconnected. If the DAC had remained enabled—perhaps even modestly upgraded with a few premium parts—the new buyer would be spared an immediate additional expense of at least \$500 for a decent outboard DAC. But remember, the Data III is aimed primarily at the audiophile, not the videophile.

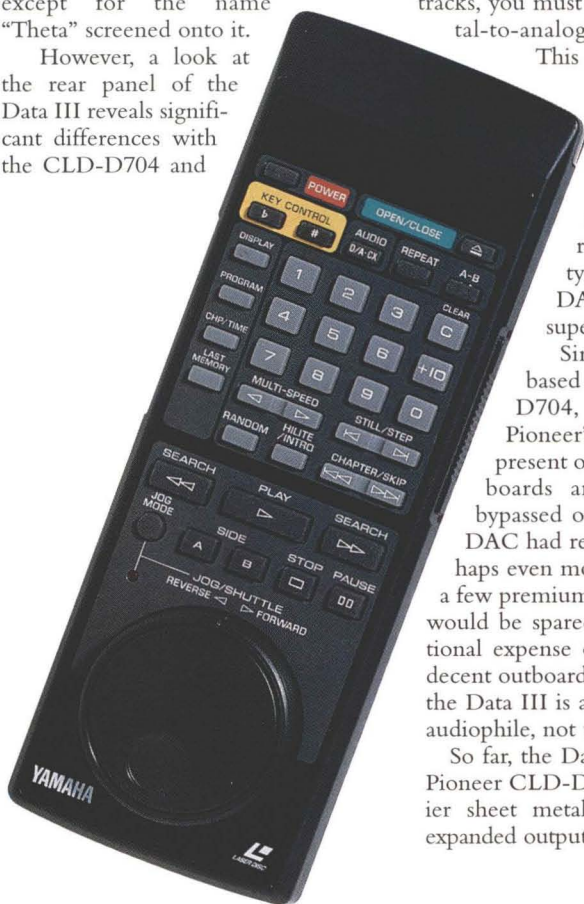
So far, the Data III appears to be a Pioneer CLD-D704 wrapped in heavier sheet metal with upgraded and expanded outputs. There is a bit more

Theta Data III back panel

to it than that, however. Although the original power supply is still used for a few chores, an entirely new power supply was added for the more critical functions. A new circuit board was also added under the main board for audio re-clocking and digital output. The video circuits are not changed in any way, but they are tweaked, which presumably reduces unit-to-unit variations.

Poking around inside the Data III side by side with the Pioneer Elite CLD-79 (a near-clone of the CLD-D704), I saw no differences in the mechanicals. The main visible change was the new power supply in the Theta, plus a slightly different layout of the main circuit boards. This may be a function of the difference between the Elite CLD-79 and the CLD-D704; although both Pioneers are *very* similar, the Data III is based on the 704. There appear to be three reasons for the extra weight of the Data III: the added power supply, the thick front panel, and the heavier chassis that supplements the original Pioneer chassis, which is visible inside the new one.

Why did Theta choose the Pioneer CLD-D704 as the basis for the Data III instead of the arguably more robust, heavy-duty Pioneer Elite CLD-97? Availability, for one thing. The CLD-97 is used by McIntosh for their laserdisc player, but the availability of this now-discontinued unit may well be limited. I do not consider the use of the CLD-D704 to be a negative; in my judgment, it produces a better-looking





Theta DS Pro Basic III D/A converter.

picture than the CLD-97, although not everyone will agree with me on this (perhaps moot) point.

Systems and methods

Both the reference home-theater system and the separate, audio-only system used in evaluating the Theta are described in my review of the Pioneer CLD-79 elsewhere in this issue. The video system included the Runco IDP-980 Super IDTV II projector and SC-3050 Super IDTV II scan converter.

As in my review of the CLD-79, the comparisons that follow were made using two copies of several laserdiscs, placing one on each machine, cueing them in sync, and switching between them. Occasionally, the cueing was deliberately out of sync so I could view the same scene twice in succession, first on one machine and then on the other. All video connections were composite.

Oh say can you see...

The picture from the Data III is stunning. Even on the big screen, sharp laserdiscs are crisp-looking. I don't expect to see a sharper image on the best current laserdiscs than I saw from the Data III. Color saturation and lack of noise are also first-rate.

If the above description sounds familiar, it should. It is very close to my description of the Pioneer CLD-79.

Should I come up with different superlatives? Metaphor and simile you into submission? Videowise, the Theta Data III is at the current state of the art. It reveals all the glories of laserdiscs (and the warts as well). On the Theta, I suspect that the format itself looks as good as it ever will.

I have only one problem with the video performance of the Data III, and the first paragraph above gives it away. The video from the Data III is no better, in any respect, than the much less expensive Pioneer CLD-79. It is easy to compare the two; their video output levels are within six percent of each other (an essentially invisible difference), so I was free to concentrate on other characteristics. But there was nothing to compare: no difference in color quality or saturation; the same low level of noise; the same sharpness, shadow detail, and overall clarity; the same sparkling, naturally detailed images. Both machines gave me all I could hope for from the laserdiscs I watched on them.

Comparing the Data III with the Pioneer CLD-D704, I ran across the same problem I had in comparing the latter to the CLD-79: higher video output from the CLD-D704. Sometimes, I preferred the picture from the Pioneer, sometimes the Data III. While the Theta sometimes appeared a hair sharper, that may have been simply due to the slight

differences in video level.

(Adjusting the contrast to reverse the impressions was not really successful.) But I never developed a clear, consistent preference for the Theta over the Pioneer.

The sound from the Theta Data III depends very much on the outboard DAC with which it is paired. (Readers new to the concept of separate transports and outboard DACs should know that any transport should work with any converter, given the same types of inputs and outputs on both. See "Outboard DACs: A Sound Upgrade" elsewhere in this issue for more on the subject.) For the purposes of this review, I paired the Data III with Theta's DS Pro Basic III DAC.

With video material, the Theta duo sounds first-rate, with a sweet top end (within the limits of the program material) and tight, deep bass. I must say that the sound from the Pioneer CLD-79 (and the identical-sounding Pioneer CLD-D704) is *very* close, with the Pioneer having a slightly crisper treble and a less well-defined bottom end. As Bob Harley points out in his review of DACs elsewhere in this issue, a good outboard DAC can definitely improve the sound of a laserdisc player. However, whether or not it actually fulfills this promise depends on the system, the laserdisc player, the converter, and the program material.

Caveat Emptor

We cannot discuss laserdisc players in a vacuum. Is there any point in buying an expensive laserdisc player now, with DVD on the horizon? If you have already invested in an extensive collection of laserdiscs (or you have ready access to a large rental library), a high-end laserdisc player makes sense, especially if your old player is getting a bit long in the tooth. And with development shifting over to the new format, the current high-end models are probably as good as they're ever going to be.

However, if I were just starting my video collection, perhaps looking for something significantly better than VHS, I would be tempted to wait a bit and see how the market plays out. If DVD fulfills its technical promise, is affordable, and catches on in the marketplace, the laserdisc's days will be numbered. Of course, we have no crystal ball here. In an evolving, fluid market, the caveat should be well noted by the emptor. —TJN

In my audio-only room, I inserted the Data III into my high-end reference system, where it replaced the resident Denon DP-S1, an \$8000 jewel. The DAC is a Mark Levinson No.36. The two transports sound quite different; equally valid, each in its own way, but not the same. The Theta is more detailed and tighter-sounding, the Denon a little sweeter, more laid-back, and less analytical. Which one sounds "better"? It depends very much on the rest of your system, but the Theta Data III definitely belongs right up there with the best CD transports.

In the same audio system, the sound of the Data III mated to Theta's own DS Pro Basic III DAC (using a coaxial digital link) was superior to the quite good-sounding, one-piece Pioneer Elite CLD-79. The Pioneer is sweet and dimensional, but notably less transparent-sounding than the Theta duo. The latter is more clearly detailed, from the top of the spectrum to the bottom.

It is not surprising that differences are more pronounced in a 2-channel audio system. While the best movie soundtracks can be surprisingly good, none of them are as pristine as the best audio-only recordings. Furthermore, the rest of the reference audio system has higher resolution than even my definitely high-end home-theater setup. In a 2-channel system, the listener is also free of the disarming qualities of surround sound. Despite this, however, it must be said that Theta's decision to disable Pioneer's onboard DAC in the Data III was commercially astute. The sound of that D/A converter is *very* good, both on laserdiscs and CDs, if the sound of the Pioneer CLD-79 is any indication.

I observed approximately 400 lines of horizontal resolution from the Data III using the appropriate resolution chart from *A Video Standard* as the source. [The SMPTE resolution chart on AVS (frame 50789) provides a highly subjective measure of horizontal resolution. In addition to being open to interpretation, the setting of the video display's sharpness control (another subjective item) directly affects apparent resolution. But any way you slice it, the Theta's resolution is exemplary—Ed.]

A side change takes 11 seconds with

**The sound
from the
Theta Data III
depends very
much on the
outboard DAC
with which it is
paired.**

Film mode engaged, 15 seconds without—slightly longer than the CLD-79. Since the two players are mechanical clones, I suspect the difference is due to unit-to-unit variations; in any case, it's essentially irrelevant, particularly in Film mode. Although the Data III is more massive than the CLD-79, its mechanical operating noise is essentially the same: audible but not obtrusive on laserdiscs, and very quiet with CDs.

The open question

There is no doubt that the Theta Data III is a first-class laserdisc player, and in conjunction with a good outboard DAC, it will make your laserdiscs and CDs come alive. But whether or not this combination is your best choice is an open question. If you plan to use the Theta primarily for video, I have a hard time recommending it over the similarly superb Pioneer CLD-79 or CLD-D704. I simply see no visual—and little aural—reason to pay three to four times the price of the latter machines. We're talking \$1440 for the CLD-79 vs. \$7195 for the Data III plus the DS Pro Basic III without the optical-out options, although Theta does offer other, less expensive DACs.

For heavy home-theater use combined with casual (or just occasionally serious) music listening, the nearly \$6000 price difference will definitely

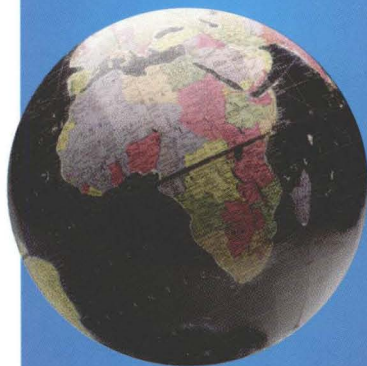
buy you more overall improvement if spent elsewhere. My internal inspection give me no reason to expect that the Data III will be less subject to long-term mechanical wear and tear than the CLD-79. If your funds are unlimited, of course, the Data III definitely looks more impressive on the shelf than the attractive but somewhat plastic, wet-look CLD-79.

This magazine is, after all, a guide to home theater, so the above comments must be made. But if your system is primarily audio-oriented, with only occasional video use, the whole picture changes (pun intended). In high-end audio terms, the Theta is a genuine winner. Only you can evaluate your priorities and budget to determine if the undeniably superb Theta Data III—and DS Pro Basic III—are intelligent choices for your wallet and your intended application.

SGHT

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YAMAHA CDV-W901

LASERDISC PLAYER

Thomas J. Norton

Karaoke tonight—yeee-haa! Well, maybe. If you're into that unique social phenomenon that offers everyone the chance to be Elvis (or Judy, or Frank, or Barbra, or Luciano, or Beverly) for a night, the Yamaha CDV-W901 might just be your laserdisc player. With its two microphone inputs (with separate level controls) and other Karaoke-oriented features, the 901 is ready to turn your living room

into the main ballroom at Caesar's Palace. [A smoky neighborhood dive is more like it—Ed.]

But we're not interested in Karaoke here, and you'll read no more about it. Our interest is in the CDV-W901 as a laserdisc/CD player for home theater. This Yamaha player is manufactured by Pioneer, so there are no surprises in the features it provides. Digital special

effects—forward and backward slow and fast-motion, still frame, etc.—are possible with both CLV and CAV discs. (The fast-scan mode is jerky, but serves its purpose.) In addition, there are the requisite programming and search functions. The full-function remote is a familiar Pioneer design, complete with illuminated buttons and a jog/shuttle wheel.

A Display Off button acts much like Film Mode on other machines; the turnover mode displays a black screen and the front-panel display is turned

off. A separate Quick-Turn button speeds up side changing (which disables a number of other functions that are not normally required during film playback). A separate CD tray speeds up CD playback operations.

The CDV-W901 also has its share of marginally useful or ignorable features. Among the latter: bass extension, which produces either flat output or three levels of bass boost. This is the sort of feature you play with once, then turn off and forget. If you need to alter the bass balance, there are better places in most systems to do it.

For those who wish to upgrade to an outboard D/A converter, the CDV-W901 provides a digital audio output. Unfortunately, it is a TosLink optical output. While many argue that the type of digital interface is irrelevant—and will show you measurements to “prove” it—many audiophiles (including yours truly) are convinced that a coaxial digital link (or an AT&T optical link, which some like even better) is sonically superior.

Systems and methods

The systems used in evaluating the CDV-W901 are described in my review of the Pioneer CLD-79 elsewhere in this issue. The video reference system included the Runco IDP-980 Super IDTV II and SC-3050 Super IDTV II scan converter. The comparisons in this review were made using two copies of several laserdiscs, one on each player, cueing them either in sync or slightly out of sync (to view the same material sequentially), and switching between them. All video connections were composite.

Having a look-see

The Yamaha CDV-W901's performance tracks its price. That is, it is priced a bit below the best laserdisc players on the market, and its performance is correspondingly a little less pristine.

Yamaha CDV-W901

Combi laserdisc player with IR remote
Frequency response: 4 Hz–20 kHz, ± 0.5 dB
S/N ratio: 115 dB
THD: 0.0035%
Inputs: 2 microphone
Outputs: 2 S-video, 2 composite video, 2 L&R Audio, 1 TosLink digital, 1 AC-3 RF

Dimensions: 5.2" x 16.9" x 16" (HxWxD)
Weight: 15.7 lbs.
Ser. #Z018705UW
Price: \$899
Yamaha Electronics Corporation USA
6660 Orangethorpe Ave.
Buena Park, CA 90620
tel. (714) 522-9105
fax (714) 522-3913



This is no slam at the Yamaha. Viewed alone, with no direct comparison against anything else, there are no obvious flaws; the picture will be well above most potential buyer's expectations. It is crisp looking, with well-saturated colors and no obvious video noise, and it is sonically satisfying on the best soundtracks.

When I compared it with the slightly less expensive Marantz LV520, the Yamaha's video output was lower (not a defect or a negative, just a design choice), resulting in slightly greater color saturation. In theory, this can be nulled out by a minor readjustment of the user controls on the television, although it is not always possible to precisely reverse the relative look of two players by doing so. Still, there was little difference between the two players, particularly on a good 60-inch PTV such as the Mitsubishi VS-6085.

Even on such a set, however, it was possible to see the difference between the Yamaha and a more expensive player, such as the Pioneer CLD-79. The latter betters the Yamaha—subtly so on the Mitsubishi 60-incher, more clearly on the big Runco. The Yamaha looks slightly grainy and less sharp in comparison, clearly sacrificing a final increment of video performance. The CLD-79 is at the video state-of-the-art, while the Yamaha is a notch below that.

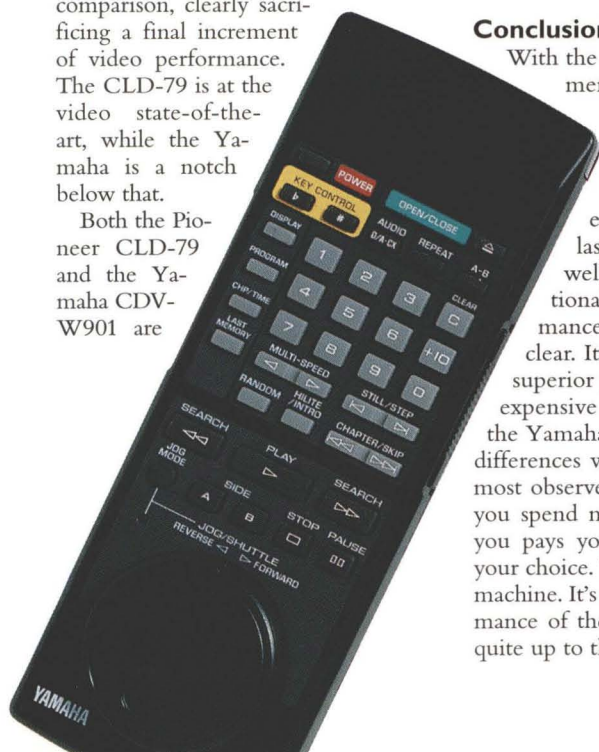
Both the Pioneer CLD-79 and the Yamaha CDV-W901 are

good sonic performers. On video soundtracks, however, the Pioneer has slightly tighter, deeper bass and a more open, spacious top end; the Yamaha sounds a little more forward. The differences are more audible when listening to CDs on a high-end, 2-channel, audio-only system. In this case, the Yamaha is a little dry-sounding and slightly two-dimensional. It is definitely listenable, but not special. This looks worse on the page than it sounds; it describes any number of mass-market CD players that are satisfying and inoffensive but not riveting and generally costing under \$500. The Yamaha can certainly compete in such company, and give you video replay, to boot.

I noted about 390 lines of horizontal resolution from the CDV-W901 using the appropriate test pattern on *A Video Standard*, which is as good as I've seen. (Reading these results is somewhat subjective; I wouldn't claim an accuracy of greater than ± 10 lines in the reading.) [See my note regarding horizontal resolution in the *Pioneer* and *Theta* reviews—Ed.] A disc side change took about 12 seconds in standard mode, 10 seconds in Quick Turn. Mechanical noise was typical for machines at these (and higher) prices.

Conclusions

With the very best playback equipment, such as a high-end projector with line doubler or quadrupler, I certainly feel that the extra \$300 to \$500 commanded by the best performing laserdisc players is money well spent. On more conventional sets, the price/performance equation becomes less clear. It is still possible to see the superior performance of the more expensive players—compared with the Yamaha—on a good PTV, but the differences will be less pronounced to most observers. Do I recommend that you spend more if you can? Yes. But you pay your money and you take your choice. The CDV-W901 is a good machine. It's not quite up to the performance of the best players, but it's not quite up to their price, either. **SGHT**



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Tom Nussaine, *Sound & Image*, Feb./March 1995

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Julian Hirsch, *Stereo Review*, December 1994

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Peter Mitchell, *Stereophile* Vol. 17 No. 4, April 1994

"...delivered enough punch to shake the sturdiest shelf"

Brent Butterworth, *Video Magazine*, April 1994

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Gary Reber, *Widescreen Review* Vol. 3 No. 1, Mar. 1994

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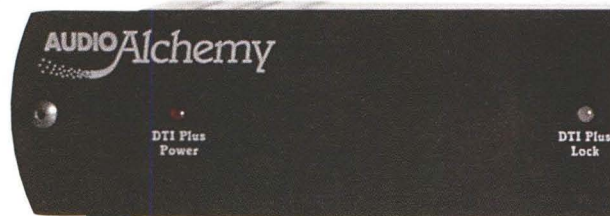
DIGITAL-TO-ANALOG CONVERTERS

Robert Harley

The first time I compared the sound of a laserdisc player's built-in digital-to-analog (D/A) converters with outboard DACs, I was taken aback by how much better the outboard converters sounded. It isn't surprising that a stand-alone converter designed to compete in the demanding audiophile marketplace would be better than the "afterthought" converters thrown into most laserdisc players. What is surprising, however, is how few home-theater enthusiasts take advantage of this large upgrade in sound quality. *[Readers unfamiliar with the ins and outs of D/A converters may want to peruse RH's "Outboard DACs" feature in this issue before tackling the following reviews—Ed.]*

The past few years have seen the introduction of great-sounding outboard DACs at lower and lower prices. Today's \$500 converter would easily beat most \$1500 converters designed five years ago due to better parts quality, economy of scale, and the higher skill level of today's designers.

With all these good-sounding DACs available, and the often-dismal sound offered by laserdisc players, my esteemed editor gave me the task of reviewing a very small sampling of converters suitable for home-theater systems.



Out of dozens of possible choices, I narrowed the field down to three representative, moderately-priced D/A converters from companies with good reputations in the digital field. In order of increasing price, they are the Audio Alchemy UltraDAC (\$499), Theta Chroma 396 (\$750), and Adcom GDA-700 (\$995).

Audio Alchemy UltraDAC

The UltraDAC is a combination of Audio Alchemy's DAC-in-the-Box D/A converter and DTI Plus jitter filter joined together by a single front panel. A separate power supply (the Power Station Three) feeds both units through a "Y" power cable and features dual transformers, one for the UltraDAC's digital circuits and one for

Audio Alchemy UltraDAC

D/A converter with built-in jitter filter
Inputs: one coaxial, one TosLink
Other technical specifications not provided
Dimensions: 11" x 1.5" H x 4" (WxHxD)
Weight: 6 lbs. (shipping)
Warranty: 5 years parts and labor
Ser. #: 87146
Price: \$499
Manufacturer:
Audio Alchemy, Inc.
31133 Via Colinas #111
Westlake Village, CA 91362
tel. (818) 707-8504
fax (818) 707-2610

Theta Chroma 396 D/A converter

Inputs: one coaxial, one TosLink
Frequency response: 20 Hz–20 kHz,
±0.2 dB

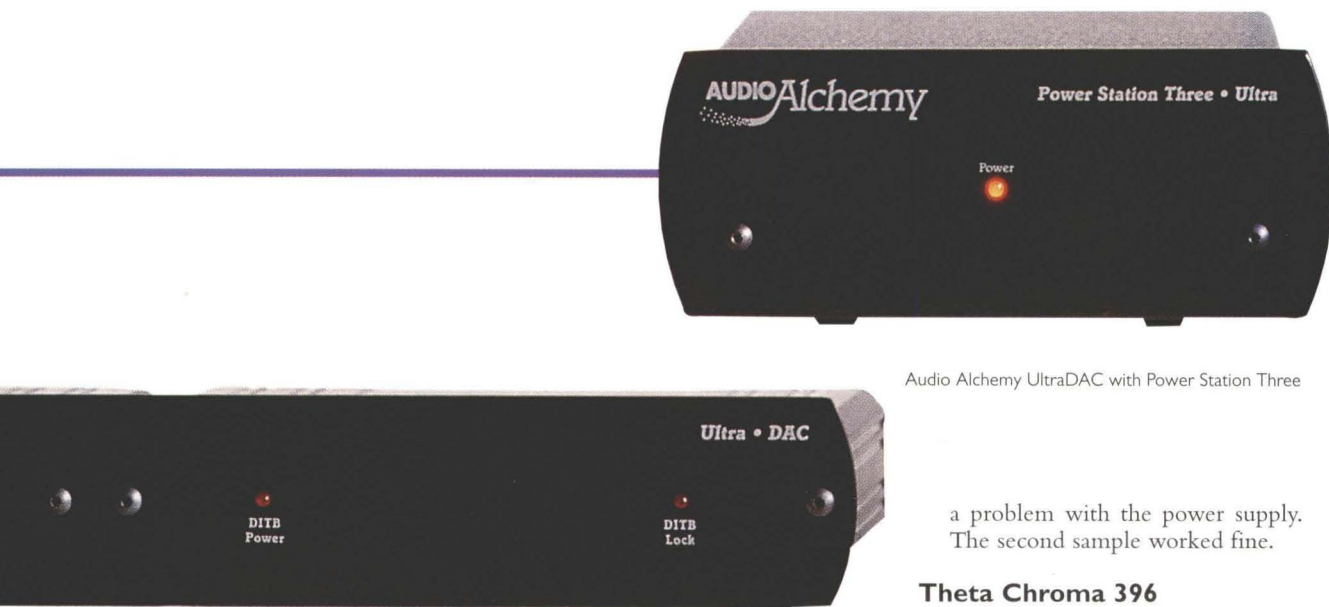
S/N ratio: >102 dB
THD: <0.004% (at full scale)
Output level: 2V RMS nominal
Output impedance: 20 Ω
Dimensions: 17" x 1.75" x 8.5" (WxHxD)
Warranty: 5 years parts and labor
Ser. #: 14574
Price: \$750
Options: ST-Type optical input, \$300;
HDCD, \$80
Manufacturer:
Theta Digital Inc.
5330 Derry Ave., Suite R
Agoura Hills, CA 91301
tel. (818) 597-9195
fax (818) 597-1079

Adcom GDA-700 D/A converter with

HDCD decoding
Inputs: Two coaxial, one AES/EBU, one

TosLink
Frequency response: 20 Hz–20 kHz,
+0/-0.5 dB
S/N ratio: 102 dB
THD: <0.009% (at full scale)
Output level: 2.23V RMS at full scale
Output impedance: 77 Ω (unbalanced),
150 Ω (balanced)
Dimensions: 17" x 3" x 10.5" (WxHxD)
Weight: 10 lbs.
Warranty: 2 years parts and labor
Ser. #: DA71DB01014
Price: \$995

Manufacturer:
Adcom
11 Elkins Road
East Brunswick, NJ 08816
tel. (908) 390-1130
fax (908) 390-9152



Audio Alchemy UltraDAC with Power Station Three

the analog stages. At \$499, the UltraDAC is less expensive than buying a DAC-in-the-Box and DTI Plus separately (each sells for \$295), and you get a better power supply to boot.

The front panel has four LEDs that indicate when each unit (DAC-in-the-Box and DTI Plus) is powered and when each unit is "locked" to an incoming digital signal. When all is well, all four LEDs should illuminate. The jitter filter has both coaxial and TosLink digital input jacks, and a single coaxial digital output. This output connects to the D/A converter of the UltraDAC using a short coaxial cable (made by TARA Labs) that is supplied with the unit. Analog output is through a pair of RCA jacks, and all RCA jacks are gold plated.

The jitter filter features the industry-standard Crystal Semiconductor CS8412 input receiver chip. This is augmented by a second-phase lock loop (PLL) that reduces jitter. The front-panel "lock" LED turns red when the first PLL has locked, and orange when the second, jitter-reducing PLL locks. The circuit also includes a relay that automatically selects the active input (coaxial or TosLink). In my experience, converting a high-jitter TosLink signal to a coaxial signal results in a big sonic improvement. In fact, I've been using a DTI Plus and an Adcom GDA-600 (the next model down from the GDA-700) in my home-theater system for the past year.

The UltraDAC's D/A converter section is decidedly more complex than the jitter filter. The incoming dig-

ital signal is recovered by another Crystal CS8412 input receiver. A Yamaha YM3434 chip performs 8x oversampling digital filtering. The DAC chips are Analog Devices AD1860s, which incorporate a good-quality 18-bit converter. Each DAC chip is hand-trimmed at the factory to assure good low-level linearity.

The analog output stage consists of a Precision Monolithics OP275 opamp. Because the AD1860 offers a voltage output (rather than the usual current output), no current-to-voltage converter is needed. All resistors are high-quality metal-film types, and the capacitors are polystyrene. The incoming 12V DC is regulated by four regulation stages on the converter's circuit board.

The UltraDAC is well made for its price, but the tiny unit is Spartan-looking next to the more expensive Theta and Adcom converters. I also had problems with the review sample: It wouldn't stay locked to the digital source unless the UltraDAC was powered up *after* it was connected to a CD transport or laserdisc player. In addition, the first sample wouldn't lock to a TosLink input, which turned out to be

a problem with the power supply. The second sample worked fine.

Theta Chroma 396

Theta Digital was one of the first companies in the world to make outboard D/A converters, and it has consistently produced superlative-sounding audiophile products. Their new Chroma 396 converter is the least expensive model in Theta's line.

The Chroma 396 is housed in a sturdy chassis with a nicely machined front panel, which includes switches that select between the 396's coaxial and TosLink inputs and invert "absolute polarity." (Some recordings have had their original acoustic polarity inverted in the recording process; the Chroma 396's polarity inversion switch restores the correct polarity. You simply listen and decide if the sound is better with the polarity inversion button in or out.) Two LEDs indicate power and signal lock. The 396 has no on/off switch; Theta assumes you will leave the converter powered continuously.

The rear panel has an AC cord jack, coaxial and TosLink digital inputs, a digital output (if you need to drive a digital recorder), and RCA analog output jacks. Holes are punched in the chassis to add balanced analog outputs (available only on the professional version) and an ST-Type, glass-fiber optical input (a \$300 option).

The Chroma 396 is impressively



UltraDAC back panel

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Adcom GDA-700

built for a \$750 converter. The unit features separate power transformers for the digital and analog circuits and five power-supply regulation stages. A "bi-directional filter" on the AC line keeps noise from getting into the unit and also prevents noise generated by the Chroma from getting back on the AC line, where it could get into your other components.

The input receiver is the ubiquitous Crystal Semiconductor CS8412, followed by a Sony CDX1244 8x oversampling digital filter. The 396 is also available with the Pacific Microsonics PMD100 High Definition Compatible Digital (HDCD) decoder/filter for an additional \$80. Considering the ability to decode HDCD-encoded recordings, along with the PMD100's superior sound on conventional CDs, I'd say it's worth the price. The review sample was fitted with the Sony filter.

Digital-to-analog conversion is handled by a dual-channel Burr-Brown PCM67, a "hybrid" DAC that is part 1-bit, part multi-bit. The 18-bit PCM67 converts the "upper" 10 bits to analog with a conventional multi-bit DAC, and the "lower" 8 bits with a 1-bit DAC. This approach reportedly combines the benefits of both 1-bit and multi-bit technologies.

The PCM67's current output is converted to voltage by a pair of high-

quality Analog Devices AD841 opamps. Dual LM6321 opamps form the output buffer stage. The direct-coupled circuit (no coupling capacitors in the signal path) uses a DC servo to prevent DC from appearing at the analog output jacks.

I was impressed by the Chroma 396's parts and build quality. The large power supply, good-quality parts, sturdy chassis, and thick front panel were more than I expected for \$750. In addition, a sticker inside the unit showed all the quality-control checks the unit had undergone, including hand calibration of the DAC, burn in, two bench checks for technical performance, and even an individual listening test before the unit left the factory.

Adcom GDA-700

Adcom's GDA-700 is the most feature-laden and technically ambitious converter in this survey. With a price tag of \$995, it's also the most expensive. The unit has four digital inputs, including two coaxial jacks, TosLink, and a high-end AES/EBU input. Although laserdisc players don't have AES/EBU outputs, most high-end CD transports do. The GDA-700's multiple inputs make it a good choice if your system includes several digital sources, particularly a separate LDP and CD transport.

A front-panel rotary switch selects the desired inputs, and a row of LEDs lets you know when the GDA-700 is locked to a digital source and indicates the sampling frequency. A second rotary switch lets you invert the audio signal's absolute polarity. Another LED indicates when the GDA-700 is decoding a recording made with the HDCD process. Unlike the other converters in this survey, the GDA-700 includes a front-panel on/off switch. Both balanced and unbalanced analog outputs are provided on rear-panel jacks.

A power supply is an important element in achieving good sound, and Adcom doesn't scrimp in this regard. The GDA-700's power supply is large, with dual power transformers, seven separate power-supply regulation stages, and large filter capacitors. Like the Ultra DAC, the GDA-700 has a bi-directional filter on the AC line to prevent noise from getting into or out of the unit.

The audio circuits are also impressive, with high parts quality. Rather than using the conventional Crystal Semiconductor CS8412 input receiver (as in the other two DACs reviewed here), the GDA-700 sports the low-jitter UltraAnalog AES21 module. The CS8412 exhibits about 200 to 400 picoseconds (ps) of jitter; the UltraAnalog AES21 exhibits 30 to 40 ps of jitter. All things being equal, lower jitter means better sound.

The digital filter is the PMD100 HDCD decoder/filter chip. Not only



Adcom GDA-700, back panel

does the PMD100 decode HDCD recordings, its superior filtering makes all sources—including conventional CDs and laserdiscs—sound better. Digital-to-analog conversion is handled by a pair of Burr-Brown PCM1702 20-bit DACs, which are found in some converters that cost \$7000.

Adcom custom-designed their own opamps for the GDA-700. Three opamps perform current-to-voltage conversion, analog output-stage buffering, and phase inversion to create the balanced output signal. The GDA-700 appears to offer high value, with lots of inputs, balanced outputs, and excellent parts quality.

Sonic impressions

I evaluated each unit on its own and in relation to the other converters under audition. Each converter was judged by its performance in my reference-quality music-only playback system as well as in my separate home-theater system.

The reference music system included a Mark Levinson No. 31 CD transport, Sonic Frontiers SFL-2 preamplifier, Audio Research VT150 tubed mono-block power amplifiers, Genesis II.5 loudspeakers, and AudioQuest cables and interconnects. The home-theater system consisted of a Sony MDP-600 LD player and a Sony STR-GX800ES receiver driving the Infinity Compositions loudspeaker system. The video

**The Chroma's
bass is easily
the best of the
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with a tight
and powerful
bottom end.**

monitor was a Sony KPR-46XBR 46-inch rear-projection TV. Loudspeaker cables were Monster MC3F HT and Monster SuperFlat to the surrounds.

UltraDAC

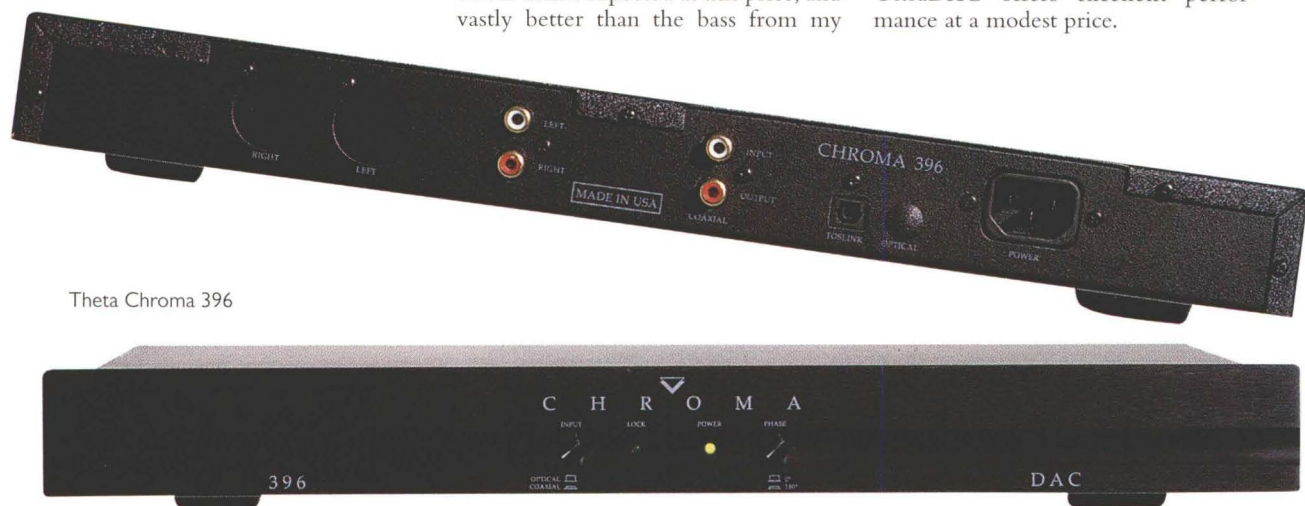
The UltraDAC sounds surprisingly good for its modest price. This little converter/jitter-filter combination has a warm and full bass with plenty of weight. The bottom end is powerful, although it lacks the control and tautness of the Theta and Adcom units. Similarly, the bass extension is deep for a \$499 converter, but doesn't have the solidity in the bottom octave of the other converters under audition. Nonetheless, the UltraDAC's bass is better than I expected at this price, and vastly better than the bass from my

Sony MDP-600 laserdisc player.

The midrange and treble sound clean and open. Many inexpensive converters add an unpleasant graininess to the sound. Although it is less clean than the more expensive Theta and Adcom converters, the UltraDAC is free from the hash that plagues a typical laserdisc player's sound. The UltraDAC also sounds much better than the DAC-in-the-Box I reviewed for *Stereophile* in the March 1994 issue. The mids are more liquid, the bass fuller, and the soundstaging is more expansive in the UltraDAC.

I also heard a big improvement in clarity, resolution of detail, and spaciousness when switching from the MDP-600 to the UltraDAC. The sound is much more open and transparent, particularly in the treble. The UltraDAC presents more treble detail than the darker-sounding MDP-600.

The film *The Mask* is a marvel of sound-effects creation and editing. The scene in which Jim Carrey first puts on the mask (chapter 7 on the laserdisc) dramatically highlights the differences between converters. The soundtrack includes a crack of thunder with low bass, some well-recorded music, and lots of subtle sound effects. The UltraDAC does such a better job of resolving all these elements that watching this scene through the MDP-600's converters is disappointing. Overall, the UltraDAC offers excellent performance at a modest price.



Theta Chroma 396

Chroma 396

The Theta Chroma 396 was impressive in both the music and home-theater systems. The Chroma's bass is easily the best of the three converters, with a tight and powerful bottom end. This solidity works with terrific dynamic impact to heighten music's rhythmic drive and makes video soundtracks more exciting and explosive. The thunder crack in *The Mask*, along with the big bass-drum whacks in the Eagles' *Hell Freezes Over* concert LD, really show off the Chroma 396's superb bass. Great bass has always been a hallmark of Theta designs, and the Chroma 396 upholds this tradition. Switching from the MDP-600 to the Chroma 396 was like going from a 10-inch to a 12-inch subwoofer.

I also like the Chroma 396's midrange and treble presentation, which are the cleanest of the group. Instrumental and vocal textures are pure and smooth, in contrast with the slight layer of grain added by the UltraDAC and, to a lesser degree, the GDA-700. However, this quality was more apparent in the music system than when reproducing video soundtracks.

The Chroma 396 also has an excellent sense of spaciousness. The soundstage is wide and deep, and it resolves space between instruments or elements of the soundtrack. The percussion on *Hell Freezes Over* is presented with a halo of air around the instruments, rather than sounding flat and homogenized into the rest of the mix.

The bottom line: When I wanted to watch a movie for fun during the review period, I made sure the Chroma 396 was back in the system.

GDA-700

The Adcom is similar in sound to the Theta, with good bass and an open, detailed presentation. The GDA-700's bass is fuller than that of the Theta, but less tight and well-defined. In the home-theater system, this difference was negligible, but was musically significant in the high-end music system.

The GDA-700's overall perspective is rather forward, meaning it tends to push images in front of the loudspeakers.

**The GDA-700
adeptly conveys
the wide dynamics
of today's
well-recorded
soundtracks, from
a whisper to
thundering impact,
without a sense
of strain or
congestion.**

This increases the sense of presence and immediacy, but it can also sound a bit forced on music. The Theta sounds more relaxed by comparison. On some loudspeaker systems that might be laid back, the GDA-700's greater vividness could be an asset.

Soundstaging is excellent in the GDA-700, with a wide and deep sense of space. It also exhibits good spatial separation between instruments in music and between dialog, effects, and music on video soundtracks. This quality, along with the tendency toward forwardness noted earlier, makes dialog clear and distinct, with no need to slightly boost the center channel—something I find myself doing with other converters.

Compared to the very clean-sounding Theta, the GDA-700 has a trace of graininess in the midrange and treble. Again, it isn't significant on video soundtracks, but it is audible on music as a slight coarseness to instrumental and vocal textures. Don Henley's vocals on the *Hell Freezes Over* LD weren't quite as smooth as with the Theta, but were vastly better than the MDP-600 and some-

what smoother than the UltraDAC.

The GDA-700 provides excellent clarity and resolution of fine detail. The sound is real and lifelike, with a vividness in low-level information. The subtle sound effects in *The Mask*, for example, are reproduced clearly and distinctly. This ability to resolve quiet sounds seems to enhance the unit's wide dynamic range. The GDA-700 adeptly conveys the wide dynamics of today's well-recorded soundtracks, from a whisper to thundering impact, without a sense of strain or congestion.

TosLink: Avoid it if you can

Next, I evaluated the sound of each converter when driven by a jitter-inducing TosLink optical cable. This reveals the converter's susceptibility to jitter. With all three converters, I could hear the difference between coaxial and TosLink connection. With the latter, bass became slower, fatter, and less well-defined. Dynamic impact was reduced, and the sound became a little harder and less spacious.

The Adcom, with its excellent UltraAnalog input receiver that rejects jitter better than the Crystal input receiver, experienced less of this sonic degradation than the Theta. I also heard less difference between coaxial and TosLink with the UltraDAC, no doubt because of the TosLink-to-coaxial conversion built into its jitter filter. Incidentally, Theta makes a jitter filter with TosLink-to-coaxial conversion called the TLC (\$199).

Laserdisc player DACs: How good are they?

After auditioning each converter in the music and home-theater systems, I compared each one to the converters built into my Sony MDP-600 laserdisc player. I hadn't listened to the MDP-600's converters for more than a year, choosing an Adcom GDA-600 and Audio Alchemy DTI Plus jitter filter for everyday use.

I know the Sony LD player's converters are of poor quality, but I was staggered by how much better even the UltraDAC sounded. In fact, the differences between the three converters

under review are smaller than the vast improvement rendered by switching from the MDP-600's converters to the outboard DACs. This isn't a case of nit-picking specific aspects of sound quality, but a dramatic and instantly obvious transformation of the presentation.

In comparison with the outboard converters, the MDP-600 lacks bass extension, sounding thinner and less powerful. Sounds that are clearly distinct through the three outboard converters become veiled and obscured when heard through the MDP-600. An entire level of fine detail is simply missing through the MDP-600.

Similarly, the MDP-600 lacks clarity, transparency, and openness, sounding dull, closed-in, and opaque. The sound is also synthetic and mechanical, rather than pure and clean. The acoustic guitars on the

Eagles' *Hell Freezes Over* laserdisc provide a striking example of how much more natural the outboard converters sound.

These differences in sound quality are important to the home-theater experience because so much of a film's emotional impact is carried by the soundtrack. Try playing an exciting scene with the sound turned way down or off, then again at full volume. It's a totally different experience. The importance of sound quality in conveying the film's artistic intent struck me as I compared the MDP-600's converters to the UltraDAC, Chroma 396, and GDA-700.

For example, the very low frequencies in *Backdraft* give the raging fires a frightening, ominous quality. When these low frequencies are reproduced with depth and power by one of the outboard converters, the film takes on a

greater intensity. Conversely, the MDP-600's lightweight bass and limited dynamics rob these scenes of their full impact. Moreover, the sounds of the burning building tend to fuse together into a continuum through the MDP-600, in contrast with the outboard converters' ability to present all the nuances the film's creators intended you to hear.

I also noted a strange phenomenon that I can't explain: the outboard converters make the surround channels more prominent, detailed, and enveloping. Switching back to the MDP-600 makes the soundfield collapse toward the front. This improvement in surround performance with the outboard converters is greater than the differences I've heard between mediocre and superb surround-channel performance in A/V receivers.

Measurements

Audio Alchemy UltraDAC

The UltraDAC's output impedance measures a low 100 Ω , and DC offset levels are negligible. The frequency response and de-emphasis tracking are perfectly flat, crosstalk at 1 kHz is low (-115 dB L-R, -122 dB R-L), and the unit has a low noise floor. (All decibel measurements are referenced to full scale.) A spectral analysis shows a hint of 60 Hz power-supply noise in the audio (at -120 dB) and a trace of second harmonic distortion, but these are low in level and shouldn't be audible.

Low-level linearity is mediocre, measuring 1.6 dB and 2.4 dB negative error in the left and right channels respectively. The UltraDAC reproduces a 1 kHz, -90 dB, undithered sine wave with good waveform shape, and the intermodulation distortion is low.

In the jitter department, the UltraDAC has between 130 picoseconds (ps) and 185 ps of clock jitter, depending on the input signal; these are good figures for a \$500 converter/jitter filter combination. The jitter spectrum is moderately clean. Overall, the UltraDAC exhibits good bench performance considering its low price.

Theta Chroma 396

The Chroma 396 has a very low output impedance of just 12 Ω , and no DC offset is present at the outputs. Frequency response and de-emphasis response are flat, and the crosstalk measures a good -105 dB (L-R) and -108 dB (R-L), although the crosstalk usually increased at low frequencies. The Chroma 396's performance on the spectral analysis is excellent, with low noise and a total absence of power-supply noise in the audio signal.

Linearity is moderately good, measuring 1.83 dB (left chan-

nel) and 0.92 dB (right channel) of positive linearity error at -90 dB. Low-level waveforms are well reproduced, with a bit more noise overlaying the 1 kHz, -90 dB, undithered sine-wave compared with the UltraDAC and GDA-700. The intermodulation distortion spectrum reveals low IMD.

The Chroma 396's clock jitter measures between 175 ps and 230 ps, depending on the test signal driving the converter. The jitter spectrum is clean and free from strong periodic jitter components. Incidentally, the Chroma 396's jitter increases to 390 ps with a TosLink input, which isn't surprising from the listening impressions. (All other jitter measurements in this article were made with a PS Audio Lambda transport and coaxial connection.)

Adcom GDA-700

The GDA-700 has the best technical performance of the three converters. Output impedance measures 78 Ω , and DC levels are negligible. The frequency response and de-emphasis tracking are perfect. Crosstalk measures a very low -120 dB at 1 kHz, and a spectral analysis reveals extremely low noise and complete isolation between the power supply and audio circuits.

The GDA-700's linearity is among the best I've measured, with no discernible error at -90 dB; it remains perfect to nearly -110 dB, which is excellent performance. This good low-level performance is confirmed by the GDA-700's superb reproduction of a 1 kHz, -90 dB, undithered sine wave. The intermodulation distortion spectrum is also excellent.

As expected (considering that it uses the UltraAnalog AES21 input receiver), the GDA-700 has by far the best jitter performance of the group. The jitter level ranges from 35 ps to 90 ps, and the jitter spectrum is relatively clean. —RH

As TJN reports elsewhere in this issue, the quality of converters in laserdisc players varies widely from model to model. Consequently, the improvement you can expect by adding an outboard converter varies. I've listened critically to only a few laserdisc players, but I found every one inferior to even inexpensive outboard DACs.

Wrapping it all up

If you've been listening to your laserdisc player's built-in D/A converters, you'll be pleasantly surprised at how much better your system can sound by simply adding an outboard DAC. The better your electronics and loudspeakers, the greater the improvement you'll hear.

Each of the three converters has a place in a home-theater system. The \$499 UltraDAC is the best choice for the budget-minded. It delivers most of

the performance benefits at a reasonable price. The UltraDAC's TosLink-to-coaxial conversion is especially helpful with laserdisc players lacking a higher-quality coaxial output jack.

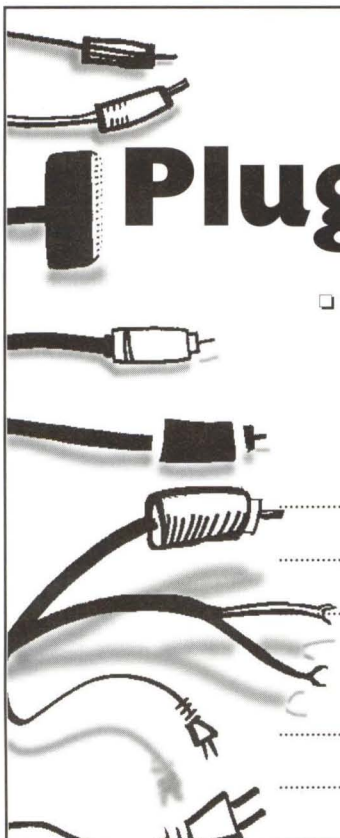
The Theta Chroma 396 offers superb sound quality on music and video soundtracks. In fact, the Chroma 396 is the best-sounding converter of the group when used with its coaxial input. Its only drawback is the lowered performance with a TosLink input compared to the UltraDAC and GDA-700. However, if your laserdisc player has a coaxial output, this is not an issue. And even if it doesn't, adding Theta's \$199 TLC jitter filter and TosLink-to-coaxial converter would boost its performance another notch higher.

At the top-end of the price scale, the Adcom GDA-700 provides good sound and offers the most features. With its low-jitter input receiver, the GDA-700

maintains its sound quality even with TosLink input. It also offers multiple digital inputs (including AES/EBU) and balanced analog outputs. This makes the GDA-700 a good choice for systems that need these features.

If you don't need AES/EBU input and balanced outputs, the Chroma 396 might be a better choice, being \$250 less than the GDA-700. You might also look at Adcom's \$750 GDA-600, which lacks balanced outputs and is a better value overall. I've been using a GDA-600 and Audio Alchemy DTI Plus jitter filter in my home theater for more than a year and have been happy with the sound.

Before you spend the big bucks for a fancy multi-channel power amp or a new subwoofer, think about replacing the link in your home-theater signal chain that may render an even bigger improvement—the D/A converter. **SGHT**



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MONSTER & XLO

THX-CERTIFIED AUDIO CABLES

Steven Stone

Speaker cables and interconnects are a necessary evil. At best, they should be utterly transparent, adding or subtracting nothing from the original signal. At worst, they are pernicious passive tone controls that inexorably alter everything that passes through them. The folks at THX seem to know this. By extending the Home THX-certification program to interconnect and speaker cables, the altruists at Lucasfilm seek to spare consumers from wire's worst sonic pitfalls.

Because no one else "volunteered" and because I'm more than slightly nuts, it was decided that I should explore THX-certified interconnects and speaker cables from two leading manufacturers. These two were chosen not because they throw the best parties at CES or have the most aggressive PR agencies, but because they were simply the first

companies to bring complete THX-certified cable sets to market. I'm sure additional ones will soon follow. For some reason, the phrase "give 'em enough rope to hang themselves" kept popping into my head during this review.

THX cables: benchmark or scam?

One cable manufacturer (who will remain nameless) sent me a paper alleging that THX "is a licensing program developed by a person [Tomlinson Holman at Lucasfilm] who doesn't believe cables make a difference... except for using a minimum size (maximum resistance) and avoiding high capacitance. THX cable certification only refers to these primitive cable concepts and to color coding." Obviously this manufacturer doesn't offer any THX-certified cables.

These allegations proved to be only partially correct. Perhaps Tomlinson Holman *doesn't* believe cables make any difference in the sound of a THX surround system. This is irrelevant since other people at Lucasfilm do. While THX certification does involve testing for resistance and capacitance per foot, Lucasfilm also tests for inductance, stranding methodology, flexibility, and mechanical integrity.

Unlike loudspeakers—which must satisfy specific design/performance goals in order to receive certification—THX has no set specifications for cables and interconnects. Manufacturers are not limited to any particular choice of materials or design parameters. In the words of one Lucasfilm employee, "We let cable designers do their own thing." The main concern at THX is that wire meet particular minimum performance criteria so it won't act as a radical passive tone control.

Once tested, if it satisfies Lucasfilm's criteria, cable can be certified. All that remains is for manufacturers to make certain cosmetic changes. THX-certified cable uses a particular color-coding scheme to help make installation more trouble-free (assuming the installer isn't color-blind). Maximum permissible lengths must also be printed on the

Monster 351 subwoofer interconnect



Monster M-series THX-certified cables

M-756 audio interconnect

6-channel side-by-side configuration
4-meter set M756 HT-4M
Per foot capacitance: 144 pF
Per foot inductance: 68 microHenrys
Per foot resistance: 3Ω
Price: \$750

M-351 subwoofer interconnect

4-meter set
M352 SW HT-4M
Per foot capacitance: 52 pF
Per foot inductance: 1.7 microHenrys
Per foot resistance: 0.0344Ω
Price: \$60

MP 3F speaker cable

Maximum length: 40'
Per foot capacitance: 22.5 pF
Per foot inductance: 0.76 microHenrys
Per foot resistance: 0.0043Ω
Price: \$12 per foot, \$45 termination charge, spade lugs \$5 per pair

MP 2S surround-channel speaker cable

Maximum length: 60'
Per foot capacitance: 21 pF
Per foot inductance: 0.75 microHenrys
Per foot resistance: 0.0073Ω
Price: \$4 per foot, \$30 termination charge, spade lugs \$5 per pair

MP SW subwoofer speaker cable

Maximum length: 50'
Per foot capacitance: 20.5 pF
Per foot inductance: 0.76 microHenrys
Per foot resistance: 0.0038Ω
Price: \$3.50 per foot, \$7.50 termination charge, spade lugs \$5 per pair



Monster M-756 audio interconnects

cable, if physically possible. In addition, Lucasfilm may occasionally suggest changes in the termination hardware.

None of Lucasfilm's tests guarantee that a THX-certified cable will sound any better than a noncertified cable. They do ensure that a cable bearing the THX logo will not cause THX-certified equipment to perform aberrantly. Since Lucasfilm specifies both input and output impedances for THX-certified electronics, using THX-certified wire guarantees that the wire will not create any impedance mismatches as long as the lengths are less than the specified maximum. Do you have to use THX-certified cables with other THX-certified equipment to achieve optimum performance? Certainly not. Certified cable should work fine with noncertified components (at least in theory).

Testing methodology

How do you test interconnect and speaker cables? Simple. You hook them up to your system and listen, right? But, what lengths of cable? In what system?

And what do you listen for? These are the kinds of questions that drive reviewers (and everyone else) nuts. For this review, I tried to test the cables in a variety of situations. Naturally, I tested each manufacturer's interconnects and speaker cables in a THX surround system consisting of a THX-certified surround preamp, THX-certified multi-channel amplifier, and THX-certified speakers. I also auditioned each manufacturer's speaker cables separately in a *Stereophile*-rated Class A 2-channel system, and listened to the interconnects in two applications: First, between a *Stereophile*-rated Class A preamp and power amp, and then from the output of a *Stereophile*-rated Class A digital-to-analog converter (DAC) to a Stax Lambda-Pro headphone system. (See the "Review System" sidebar for a detailed listing.) The THX interconnects were compared to noncertified products from Audio Magic, Synergistic Research, and Wire World; speaker cables were compared to noncertified wire from Dunlavy Labs, Audio Magic, and Synergistic Research.

The reason I tested the speaker cable and interconnects separately was to determine if their sonic properties were different from one another. It is important to know if the overall sound of a manufacturer's cables is the result of one particular part of their system. While most manufacturers—and some audio reviewers—recommend that you always use wire from a single maker in your system, you certainly don't have to do so. Mixing and matching cable can have some sonic, ergonomic, and economic advantages.

Both manufacturers were asked to supply enough cable to completely wire a THX-certified surround system. I specified 12-foot lengths of interconnect and 12- and 15-foot lengths of speaker cable. I chose these lengths based on the needs of my small-room system and those of the "average" consumer.

Monster M-series THX-certified cables

Although it was not the first "high-performance" cable manufacturer, Monster, founded by Noel Lee in 1977, is certainly the first wire manufacturer to realize the huge potential market for premium cable products. It has also been the first cable manufacturer involved in many new markets, including cable for auto-sound installations, pro-audio applications, and now THX-certified home theater.

Monster is what is referred to as a "market-driven" company. They find new markets, then develop technology

for those markets. Monster is also known for its slick packaging, excellent documentation, and user-friendly features. Monster's M-series interconnect and speaker cables are their top-of-the-line cables for home theater, and exhibit all the distinguishing features that make Monster cable monstrous.

Design and construction

Made from high-purity copper, Monster cable uses different gauge conductors with different winding schemes to defeat phase anomalies caused by the *skin-effect* phenomenon. They call this *bandwidth-balanced* design. On their interconnects, the center strands are comprised of the thickest-gauge wire for carrying low frequencies. Circling around the center strands is a thinner wire that, due to the wrapping tech-

nique, is slightly longer than the center wire. Around the outside of this bundle are the thinnest wires that, due to the physical layout of the cable, are even longer than the mid-range wires. The latter are for the upper frequencies. How does each frequency know which wire it's supposed to travel on? Perhaps electrons are far more polite than your average human driver when it comes to staying in the lane appropriate for their speed.

Monster also uses something called *multi-twist* construction on their cables. From what I can tell, this is a variation of the standard *twisted-pair* methodology—i.e., twisting the hot and ground wires diagonally around each other rather than running them in parallel along the cable's entire length. Twisted-pair design helps reject 60 Hz

hum. [Readers unfamiliar with basic cable terminology, design, and construction may want to refer to Wes Phillip's comprehensive primer on the subject, "Getting Wired," in the Spring 1996 SGHT, Vol. 2 No. 1.—Ed.]

The dielectric (insulation) material used on Monster cables is a proprietary material called *IsoTex* that has a very tacky surface. This surface forms a good mechanical bond that helps attenuate microphonic characteristics that might be present in the wire. Monster interconnects not only have an outer foil wrapping shield, but also a braided metal layer around the foil to provide a strong yet flexible grounded shield. They should easily be able to withstand installation under carpets in high-traffic areas.

Monster's spade lugs are made of brass coated with "hard" gold plating.

Review Systems

Digital front-ends

Sony MDP-750 laserdisc player with the TosLink digital out routed through an Audio Alchemy DST-powered digital interconnect, Sony D-7 DATMAN, and PS Audio Lambda and CEC TL-2 CD transports connected via coaxial, AES/EBU, TosLink, and ATT optical connectors to either an EAD DSP-7000 III or EAD DSP-9000 III digital-to-analog converter.

Analog front-ends

VPI TNT Jr. turntable with cost-effective upgrade and outboard flywheel on a Bright Star base and Townsend Seismic Sink. Tonearms included a Graham 1.5 TC and Clearaudio/Souther TQ-1. My small video room has a VPI HW-19 mark IV with SAMA sitting on a Bright Star J-7 base, mounted with a

Clearaudio/Souther TQ-1. Cartridges included the van den Hul MC-1, Dynavector XX-11, Fidelity Research/van den Hul FR-1, Denon 103/van den Hul, and a Denon DL-SI.

Preamplifiers

Fosgate Model 3A, Threshold T-2, and Carver Research Lightstar; Vendetta SCP-2C, Audio Research PH-2, and Gold Aero dB-45 outboard phono units.

Power amplifiers

Parasound HCA-1206 THX-certified 6-channel, as well as Rowland Model 6, Manley Reference 240, and Pass Aleph 0 stereo amplifiers.

Loudspeakers

Dunlavy Signature VIs (large room); Avalon Eclipse and Triad Gold THX (small room).

Accessories

CornerTunes, EchoTunes, and custom-made ceiling clouds by RoomTunes; Tube Traps and Shadowcasters by Acoustic Sciences. Arcici Levitation stand, RoomTunes Just-a-rack, Arcici Superstructure II, Soundstyle X503, and Billy Bags amp stands. All major components use Bright Star Audio Big Rock bases and Little Rock top-plates (in small room), Shakti Stones, Flux buster, PAD break-in disk, Music and Sound ferrite beads, AudioQuest ferrite clamps, Noisetrappor power strip, Synergistic Research power cords, TARA Labs RSC master power cords (with Pass Aleph 0), Coherent Systems EAU-1 Electroclear AC line conditioner, AudioQuest record brush, Gryphon "Exorcist" conditioning tool, Nitty Gritty record cleaning machine, RadioShack sound pressure meter, Kleenmaster Brilliantize CD cleaner, and a pair of plastic "supercalafragalistic" 3-D glasses.

Monster MP SW subwoofer speaker cable



Monster/XLO THX cables

XLO/VDO audio interconnects

They are crimped and soldered onto the speaker wire. Their RCA plugs use a unique "turbine" 12-cut design. These gold-plated plugs feature 12 evenly spaced diagonal slits on the outside of a heavy mass shell. To say these jacks fit snugly is like saying that bulldogs have adequate jaw muscles. The idea is to produce a jack that provides the best possible low-loss signal transfer.

While Monster interconnects do have directional marking, directionality is due to grounding methodology (i.e., one side has the outer mesh jacket attached to the RCA jack, the other doesn't) rather than any inherent directionality of the wire itself. Since these are THX-certified cables, they use the standard THX color scheme: blue is left, green is center, red is right, blue-white is left surround, red-white is right surround, and brown is subwoofer.

The best-laid plans...

First, let me go on record as stating unequivocally that all THX-certified

cables do *not* sound alike. When I first began this review, I was hoping that THX-certified cables would all sound identical, so the "Sound" section of this review would be the shortest in *SGHT* history. I get paid by the article, rather than by the word, so this would have made writing these reviews a breeze. "Use whichever THX cable is the cheapest" would have been my sage advice. But no such luck. Not only does each product sound different, but each manufacturer's interconnect sounds different from their speaker cables. Journalistic accuracy is bloody time-consuming.

My first test involved substituting the Monster single-ended, RCA-terminated M-756 interconnects for the balanced XLR interconnect I had been using between my Pass Aleph P preamp and Rowland Model 6 amplifier, driving a pair of Dunlavy Signature VI loudspeakers. My reference interconnects from Synergistic Research and Audio Magic are both substantially more expensive than the Monster cables.

The first thing I noticed after inserting the Monster interconnects into the system was a reduction of dimensionality. The instruments on *The Great Clarinet Quintets* (Boston Skyline Records BSD 135) lost their precise, individual locations and began to blur together. The soundstage also shrank, reduced to a mere four-fifths of what it had been. I felt like I had been bounced by an unfriendly usher from row A to row J. Definition was decidedly inferior through the Monster cable, with subtle details like the sound of the rosin on the players' bows obscured. Harmonic balance through the Monster cable was quite acceptable, however, with only a slight loss of harmonic complexity and top-end air. Oddly, the tape hiss of this old tape-to-CD transfer was more obvious through the Monster cable.

The Monster MP-3F front speaker cable fared much better when compared with Synergistic Research and Audio Magic speaker cables. Placed between a pair of Rowland Model 6 amplifiers and a pair of Dunlavy Signature VI speakers, MP-3F preserved most of the inner detail and harmonic balance displayed by the hyper-expensive cable. On Sarah McLaughlin's song "Long Way Down," from a live performance on an E-Town DAT, I was surprised by how well the Monster cable preserved the dynamics and inner detail of the performance. Also, the MP-3F did a superb job of retaining full soundstage size and image height. Considering this cable's price, its performance was outstanding.

My next test was to use the Monster M-756 interconnect between an EAD DSP-7000 DAC and a Stax headphone amplifier, driving a pair of Stax Lambda-Pro headphones. Here I compared the Monster interconnect with both AudioQuest Diamond and XLO ER-4 wires. The M-756 was noticeably duller-sounding than the other two cables. The music's sparkle and the string instrument's sheen was attenuated by the Monster cable. Inner detail and low-level definition also were not as good through the other two cables. On Paula Cole's song "I'm so Ordinary," individual parts like the acoustic guitar and synthesizer that share the left side of

XLO/VDO-series THX-certified cables

ER-4 audio interconnect

Maximum length 100'
Per foot capacitance: 32.3–48.0 picroFarads
Per foot inductance: not available
Per foot resistance: 0.024Ω
Price: 4-meter length \$306; \$20 per meter pair unterminated; termination charge \$30 per pair

ER-11 speaker cable

Maximum length of runs: 50'
Per foot capacitance: 21.6 picrofarads
Per foot inductance:

0.14 microHenrys
Per foot resistance: 0.0377Ω
Price: \$3.50 per mono foot unterminated; termination charge \$50 per pair, including spade lugs; spades only \$12.95/four-pack

ER-14 surround-channel speaker cable

Maximum length of runs: 95'
Per foot capacitance: 19.34 picrofarads
Per foot inductance: 0.15 microHenrys
Per foot resistance: 0.041Ω
Price: \$1.75 per mono foot

unterminated; termination charge \$30 per pair, including spade lugs

ER-12 subwoofer speaker cable

Maximum length of runs: 100'
Per foot capacitance: 25.9 picrofarads
Per foot inductance: 0.14 microHenrys
Per foot resistance: 0.0368Ω
Price: \$7 per mono foot unterminated; termination charge \$50 per pair, including spade lugs

the stage blended together rather than remaining distinct and separate entities. Background vocals were also obscured and slightly blurred through the Monster cable.

Finally, I installed the Monster cables into a complete THX-certified surround system. Here the strengths of the Monster MP-3F speaker cable shined through. Harmonic balance was very good, with no part of musical spectrum attenuated. In the THX system the Monster wire seemed to be a sort of sonic bromide, smoothing out rough edges, trading off a slight reduction in definition for a more palatable overall sound. While the monster cable never excelled in any one sonic parameter, it did not have any major Achilles' heels. This isn't the kind of cable that will ever push a system over the edge from listenability into nastiness.

Wrapping up

Taken as a system, the Monster THX-certified wires are good, but not great. I found the speaker cable to be a far superior performer to the interconnect. The speaker cable was good enough to be placed in a high-definition, Class A stereo system. Compared with speaker wire costing 10 times its price, it performed competitively. The interconnects were not as sterling, marred by their reduction of fine detail, high-frequency air, and microdynamic information. While I didn't find the overall performance of these wires to be bad, I feel that using Monster speaker cables with another manufacturer's interconnects may result in a higher level of performance than using them with M-756 interconnects.

XLO VDO THX-certified cables

XLO Electric Company was founded by Roger Skoff in 1991. Skoff is a former writer for the now defunct audio magazine *Sounds Like* as well as a UCLA-educated economist. His early experiments with cable geometry and physical construction led to his first product, the XLO Type 1, in 1988. It was

While these RCA plugs are certainly lighter than many others I've seen, they are not flimsy or cheap.

an immediate success, and XLO Electric was born. His latest products, the VDO line of cables, are designed specifically for home-theater applications. XLO even makes VDO cables for video and RF antenna applications. In this review, we will concentrate on their THX-certified interconnect and speaker cables.

Design and construction

XLO/VDO "Enhanced Resolution" cables are all made right here in the good old USA, using oxygen-free, high-conductivity (OFHC) copper that is

99.99% pure. The copper also receives two proprietary treatments before it is insulated. (Accupressure massage perhaps?) Rather than PVC or rubber, XLO uses DuPont Alathon polymer insulating materials on their cores, positioners, and primary jacketing. The outer jackets are made from either DuPont Elvax or Surlyn.

XLO takes special pride in their metal termination connectors. While they do use gold plating, XLO uses no intermediary layer of nickel between the underlying copper and the gold plating. This nickel layer, according to XLO, can introduce hysteresis and residual magnetism problems. These phenomena can have a negative effect on the performance of a speaker cable, unless you want to attach it to your metal-detector.

On their speaker cables, instead of employing super-thick, heavy-gauge metal spade lugs, XLO uses much thinner materials. These thinner spade lugs reduce the possibility of self-inductance, which can occur when thick metal lugs are used to conduct an AC electric field. Less massive spade lugs also reduce the possibility of skin effect, which can introduce phase-shifts throughout the audio frequency range.

XLO's RCA plugs are also a unique design developed by Roger Skoff. Instead of a high-mass metal outer shell, like on Monster products, XLO uses thin-walled outer shells combined with thin-walled center pins. Again, the use of thin metal is an

attempt to limit the pernicious effects of self-inductance and skin effect. While these RCA plugs are certainly lighter than many others I've seen, they are not flimsy or cheap. Short of running them over with a semi, they should hold up just fine under normal use. They did, after all, pass THX certification, and "mechanical integrity" was one of the test criteria.

Strengths and weaknesses

As I emphasized earlier in my review of the Monster THX-certified cables, wire doesn't all sound the same. Like the Monster cables, the XLO wire has a

XLO/VDO THX speaker cables



mixture of strengths and weaknesses. Unfortunately for the consumer who would like to just walk in, pick some components, and wire them together, the cable used for the connection process will have a profound effect on the system's overall sound. A further complication is that it may not be in the consumer's sonic best interests to use cables only from the same manufacturer. Why do I get the feeling no wire manufacturer is going to like me very much when they finish reading these reviews?

Just as with the Monster review, I began by comparing XLO ER-4 interconnects to far more expensive wire from Synergistic Research and Audio Magic in a Class A stereo system. The ER-4 wire proved itself to be very nice stuff. While it was not quite the equal of the higher-priced spreads, it was definitely competitive. I was most impressed with the ER-4's ability to retain detail and low-level information. On densely mixed CDs like Joan Osborne's *Relish*, the ER-4 did little to smear dynamic transients or reduce microdynamics. Harmonic balance on the ER-4 was quite good with only a bit of top-end air lost. Bass definition was especially impressive with only the slightest amount of blurring compared with the expensive, balanced cables.

The XLO ER-11 speaker cable did not perform as well as the ER-4 interconnect, however. When substituted into the stereo system, the first thing I noticed was that—with the system used in this review—sibilants sounded slightly spitty. Female vocalists especially seemed to instantly develop slight speech impediments. I also found the image focus inferior, not only to my reference cables, but also to Monster MP-3F. There was a marked difference in image height between ER-11 and the other speaker cables. With ER-11, the image seemed to be lower, with less vertical extension than with the others. Not only was the image lower, but it was less precise, with the edges of instruments losing their definition, and a reduced sense of depth and three-dimensionality.

Switching back to the ER-4 interconnect, the next test placed the ER-4

Why do I get the feeling no wire manufacturer is going to like me very much when they finish reading these reviews?

between the EAD DSP-7000 DAC and the Stax headphone system. Here again, the strengths of the XLO interconnect were readily apparent. On the new Chesky release by singer and super-guitarist Badi Assad, *Rhythms* (Chesky JD 137), the ambience of St. Peter's Episcopal church in NYC was much more apparent through the ER-4 interconnects than with Monster M-756 cables. Also the sound of Assad's voice and gut-string guitar was far more realistic through the ER-4 cable. Transient energy was rendered very well, with percussion instruments and the leading edge of the guitar's attack emerging unsmear from the airy mix. In most areas, the XLO was the equal of the far more expensive AudioQuest Diamond interconnect. The AudioQuest had slightly more top-end air, and perhaps a bit more transient snap than the ER-4 interconnect. When it came to image focus, harmonic balance, and inner detail, they were indistinguishable.

The final and most important test is how the XLO wires performed together as a system with other THX-certified equipment. Here the strengths of the ER-4 interconnect and the weaknesses of the ER-11 speaker cable were apparent. While the THX-speaker system's resolution increased when the XLO wire replaced the Monster wire, the sound also became more brittle, with

what can only be described as a "bright zone" appearing in the upper midrange and lower treble regions. On the plus side, the system now had more top-end air, better lateral focus, and more transient snap.

With XLO wire in the system, I found it necessary to engage the high-frequency EQ rolloff to tame the top end on aggressive-sounding soundtracks such as *Batman Forever*. With well-recorded material, I enjoyed XLO's added definition and soundstage finesse. On poorly recorded material, however, I longed for the easygoing, more mellow balance of the Monster wire.

Summary

XLO's THX-certified wire system offers a high degree of resolution and soundstage accuracy. It will not disguise or compensate for a forward-sounding system, but with more mellow, laid-back speakers, the XLO wire might add some sparkle and upper-frequency detail that would otherwise be lacking. The ER-4 interconnect is the standout product in the XLO THX-certified lineup, closely approaching the performance of far more expensive interconnects. It is a genuine bargain. The ER-11 speaker wire was a disappointment by comparison, with a tendency toward sibilance and upper midrange hardness and glare.

So what is the moral of all this spilled ink? How about this old chestnut: *Listen to wire in your own system before you buy.* How profound! Also, don't be afraid to mix and match wire. I got the best results in my THX system by using XLO's ER-4 interconnect coupled with Monster's speaker wire. Technological détente. Whatever you do, purchase your wire from a retailer who will allow you to try it out in your system at home, and not browbeat you too badly when you bring it back. A good local retailer is still the most important component in your sound system.

Wire does not all sound the same, even THX-certified wire. Next time anyone tries to tell you that wire doesn't matter, you can tell them for me that perhaps that's true, but only when the system is on MUTE.

SGHT

ALÓN TRIO/C1

SURROUND SPEAKER SYSTEM

Wes Phillips

Bwah hah hah HAH!

The little boat skimmed along the water just like a bowling ball wouldn't," I read from a list of the *Worst Analogies of 1996*, which features clunkers from high school essays.

Tee hee hee chortled the other guys in the Editorial Department.

"Actually," *Stereophile* Music Editor Richard Lehnert mused, "that's kind of good. It really makes you think about what skimming is..."

I knew exactly what he meant. Sometimes, you have to examine what something *doesn't* do to discover whether it does what it's supposed to. That was my experience with the Alón Trio/C1 system reviewed here.

I previously reviewed the Trio system in *Stereophile* (Vol. 19, No.1), and found the package—which consists of a pair of Petite loudspeakers and a single PW1 passive subwoofer—to be articulate, engaging, and immensely enjoyable. When I called designer Carl Marchisotto to arrange its return, he

demurred. "Why don't I send you a *third* Petite, so you'll have a center channel? We've also just started manufacturing a surround-channel speaker that mates with the Petites. It's a tidy little home-theater package, and it's pretty darn good, too."

Those who know my steely resolve in the face of temptation will not be surprised that I folded like a broken flush.

PHOTOS BY ERIC SWANSON

Alón Petite two-way, stand-mounted loudspeaker with rear-firing port
Driver complement: 1" aluminum-alloy, dual-chamber dome tweeter; 5.25" tri-laminate, cast-frame cone woofer
Crossover frequency: 3.5 kHz
Crossover slopes: damped second-order
Frequency response: 55 Hz–20 kHz, ± 3 dB
Sensitivity: 87 dB/W/m (2.83V)
Nominal impedance: 8 Ω , 6 Ω min.
Amplifier requirements: 50W
Dimensions: 15" x 6.5" x 8.25" (HxWxD)
Shipping weight: 30 lbs./pair
Ser#s: 0113/0114/0711
Price: \$995/pair (\$497.50 ea.)

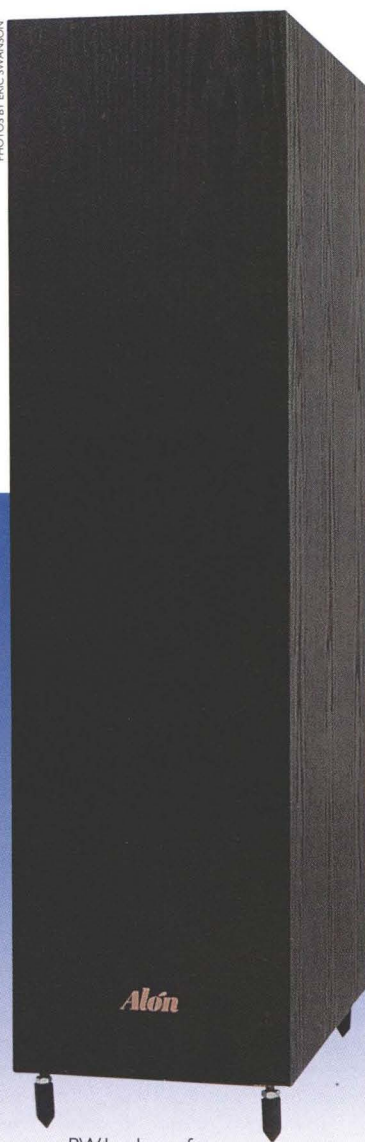
C-1 Surround/Center Channel speaker
two-way bipolar or dipolar (choose option) dynamic loudspeaker
Driver complement: two 1" aluminum-alloy, dual-chamber dome tweeters; two 5.25" tri-laminate, cast-frame cone woofers
Crossover frequency: 3.5 kHz
Crossover slopes: damped 12 dB
Frequency response: 80 Hz–20 kHz, ± 3 dB
Sensitivity: 87 dB/W/m (2.83V)
Nominal impedance: 8 Ω , 4 Ω min.
Amplifier requirements: 50W

Dimensions: 15" x 6.5" x 8.25" (HxWxD)
Shipping weight: 22 lbs. each
Ser#s: C1 0415 /C 0263 /C1 0265
Price: \$660 each

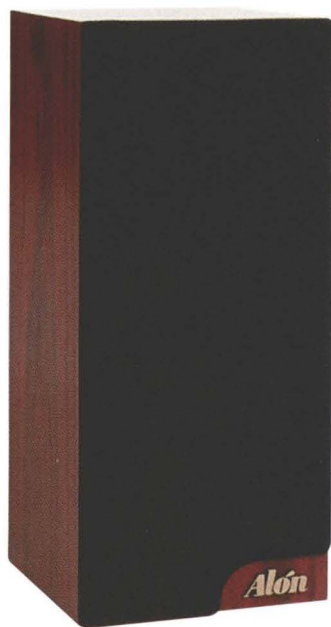
PW1 passive single-box stereo subwoofer floor-standing, lowpass subwoofer designed to mate with Alón Petites

Driver complement: two 6.5-inch tri-laminate, cast-frame cone woofers
Crossover frequency: 55 Hz
Crossover slope: damped 12 dB
Frequency response: 32 Hz–55 Hz, ± 3 dB
Sensitivity: 87 dB/W/m (2.83V)
Nominal impedance: 8 Ω , 6 Ω min.
Amplifier requirements: 50W
Dimensions: 29" x 8" x 15" (HxWxD)
Shipping weight: 39 lbs.
Ser#: PW 10149
Price: \$500

Manufacturer:
Acarian Systems, Ltd.
15 Woodview Drive
Nesconset, NY 11767
tel. (516) 737-9369
fax (516) 981-3476



PW1 subwoofer



Alón Petites

Petite jury

The Petites make *wonderful* front-channel speakers. They are a small, stand-mounted, two-way design. The cabinet is well-made and gives a satisfyingly consistent *thunk* to the knuckle-rap test. They are “partially shielded”; that is, the woofer is shielded, which means the center speaker can sit on top of your monitor on its base but not its side. They have easily removable grilles, which is exactly what should be done with them. All of my auditioning was performed grilles-off. They are *not* time-aligned and should be tilted back at approximately nine degrees to eliminate a nasal tonal quality and rhythmic discontinuities.

This presented me with my first problem. Although tilting the L and R Petites back on their stands aimed them right at my ears, tilting the center speaker (which sits on top of my 35-inch Toshiba monitor) by the same amount aimed it well above my head. This reduced the immediacy and comprehensibility of dialog, so I compromised by pointing the center speaker straight ahead; in later listening, I tilted it somewhat down and directly at my centrally located viewing position.

Of course, one result of this irregular array was less-than-perfect uniformity



of tonal presentation. I was able to adjust levels so the three front speakers were equivalent in output, but there was effectively nothing I could do about the timbre. However, I must point out that, while the differences were clearly audible using test and set-up tones, I was never really aware of them in the context of watching a film.

I mentioned to Carl Marchisotto, Alón's designer and president, that I was having some problems integrating the center Petite with the left and right channels. “That's odd,” he mused. “Wait a minute! Are you using a big-screen, direct-view monitor?” I admitted I was. “That means the center speaker is already above your head, so tilting it back *would* be a problem. Let me send you a C1 instead.”

C1, sure, but hear one? That's different!

Based on the Petite cabinet, the C1 has a matching set of drivers on its front and back panels, using the same 5½-inch woofer and 1-inch aluminum dome tweeter as the Petites. They can be ordered as either bipolar (for center-channel use) or dipolar for surround radiators. (In the former, the drivers on front and back are wired in phase with one another; on the latter, the front and back drivers are out of phase.) To improve dispersion, the tweeter and woofer are flipped on one side of the speaker. The C1 is fully shielded and can be placed on its short end or long side; I placed one on its side on top of the Toshiba TV.

The bipolar version of the C1 works ideally as a center-channel speaker. It is a close, but not perfect, tonal match to the Petites using test tones, but in reproducing soundtracks, it is superb! The bipolar radiation pattern gives the center fill a remarkable sense of depth and ambient detail. I



recommend it highly to any owner of a large-screen monitor.

In addition, the dipolar C1s are the most impressive surround speakers I have yet auditioned. I mounted a pair high on the side walls, standing on end. They absolutely disappear as sources of sound, leaving one encircled by the effects sounds but totally unable to place them in space. I found this disconcerting at first: I had grown accustomed to the slight directionality of inferior surround speakers, and I wasn't used to being immersed in the soundfield. I kept wanting to turn up the rear channels.

Once I acclimated to this effect, I reveled in the disappearing act put on by the C1s. And since they are as full-range as the Petites, they are ready for whatever form of discrete digital surround ends up dominating the market.

Being passive doesn't mean you have to stand in the corner

The PW1 is an unusual passive sub-woofer. To start, it is a single-box *stereo*

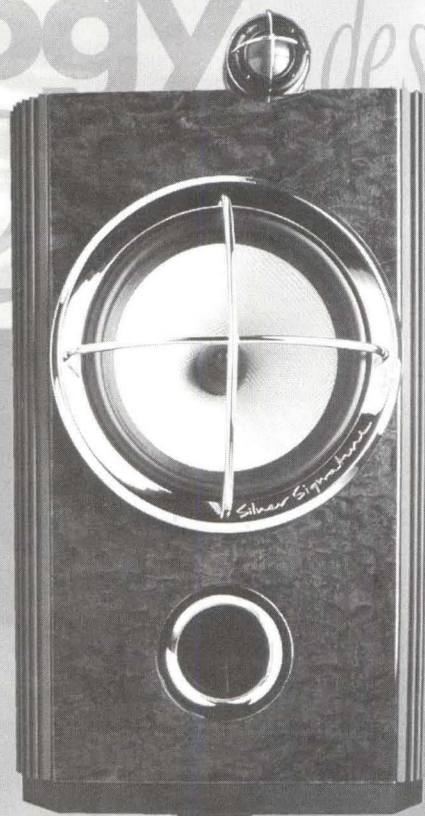
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SELECO • SENNHEISER
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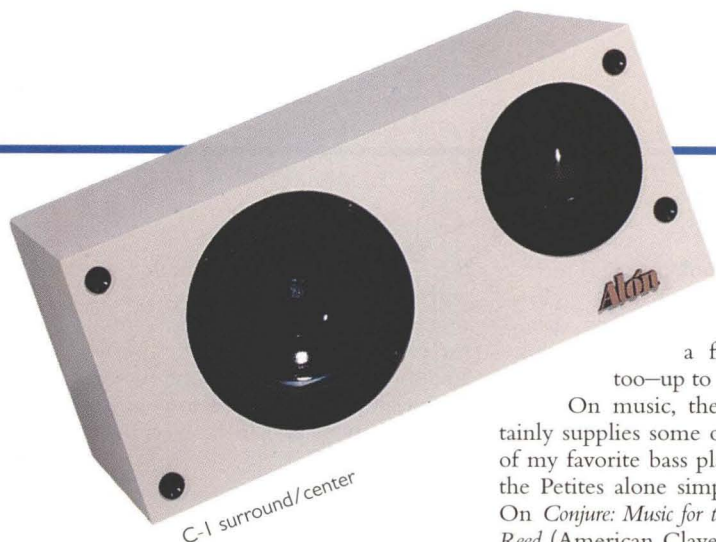
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unit, housing two down-firing 6½-inch woofers, each with its own separate crossover. Designed for use with the Petites, the PW1's lowpass filter feeds it frequencies from 55 Hz down to 32 Hz; there's no highpass filter, which allows the Petites to produce their full frequency range. (Of course, this means you don't get extra gain from the satellites when you add this woofer.)

You must play around with woofer's placement so that it blends seamlessly with the Petites, but I had little trouble getting it just right. I started with the woofer in the corner of the room, thinking that it might need the reinforcement, but this position was annoyingly audible. It ended up near to the inside edge of the left speaker, although it could have as easily been located on the right side.

I asked Marchisotto why he designed the PW1 as a stereo unit rather than summing the channels as so many others do. "I just feel that it sounds more natural if the summing occurs in the acoustic realm rather than in the electrical," he explained. "Besides, you don't need a subwoofer output on your preamp or an extra channel of amplification. All you need is an extra pair of speaker cables." In fact, he had sent me a tri-wired set of his Black Orpheus speaker cables, which puzzled me until I realized that they allowed me to bi-wire the Petites and run the subwoofer from the same amp tap.

There's no question that the Petites gain authority and fullness with the addition of the PW1. Although I found the Petites satisfying in the first place, the PW1 filled in a lot of the ambient detail from recordings that the Petites just don't reproduce by themselves. Of course, one also expects a subwoofer

to fortify bass response, and the PW1 does a fine job of that, too—up to a point.

On music, the subwoofer certainly supplies some of the personality of my favorite bass players, details that the Petites alone simply can't unravel. On *Conjure: Music for the Texts of Ishmael Reed* (American Clave 1006 LP), there are several songs on which Steve Swallow and Jamaaladeen Tacuma double on electric bass. The Petites reproduced the drive and the "bubbling up from down under" quality of the basses just fine, but it took the PW1 to clearly delineate the differences in tone and attack that distinguish these two wonderfully unique bassists.

However, really low—or really loud—bass can strain the PW1. While it is by no means a regular occurrence, I was able to make 'em crap out with really demanding music. This was far more frequent—and noticeable—with film. The deep synth tones that underlie Starling's scenes with Hannibal Lecter in *Silence of the Lambs* audibly agitate the PW-1, as does the (repeated) crash of the *Enterprise* in *Star Trek: Generations*. Far from sounding like the meeting of starship and planet at the bottom of a gravity well, it sounded like a little box near the left speaker, and not a happy one either.

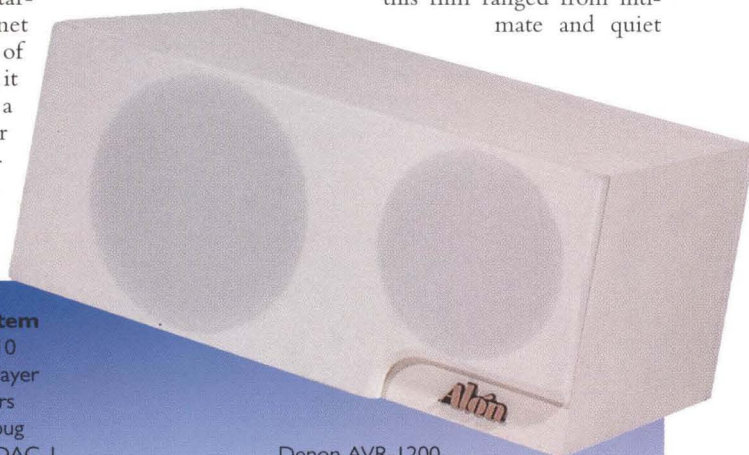
"It's a good subwoofer, pretty amazing actually, when you consider the \$500 price," I mentioned to a friend. "But it doesn't excel at explosions, rocket launches, or dinosaur footsteps. I'm not sure it's a home-theater subwoofer at all."

"And what does that say about what people value in films?" he asked. "If I asked you what made for a good movie, would you respond 'explosions, rocket launches, and dinosaur footsteps'? Or would you highlight characterization, plot, and intelligent dialog?" Hmmm. The man definitely has a point....

Are we Alón now?

Taken as a whole, how does this \$3475 speaker system sound? Quite impressive. Dialog, action on the screen, ambient cues, and music are all presented with beguiling clarity. Spatial clues and surround effects have phenomenal accuracy and seem to exist on their own, not as part of the speaker array. I found myself transported, both in the sense of being removed to a different location and in the sense of being overwhelmed by emotion—I'm *there* and I'm involved.

Watching *First Knight*, I felt as though 12th-century England surrounded me; this film ranged from intimate and quiet



Review System

Marantz LV510

laserdisc player

Sonic Frontiers

Ultra-Jitterbug

Assemblage DAC-1

digital-to-analog converter

Marantz MV610 Hi-Fi VCR

Rotel RB960 AX surround processor

Rotel RB956AX

6-channel amp or

Denon AVR-1200

surround receiver

Transparent Cable Power Link reference HPAV line filter

StraightWire Symphony

StraightWire Quartet

courtship dialog to spectacular battle sequences, and the Trio/C1 system accurately reflected every change in scale and ambience. In one scene, where Richard Gere's Lancelot and Julia Ormond's Guinivere find shelter under a tree in a rain storm, I actually looked out my window to see whether or not I was in the middle of a down-pour. (And this in bone-dry New Mexico, yet!)

Musical scores exhibit a clarity and majesty (where appropriate) that is like being exposed to raw emotion—which is, after all, what the composers are

after. Dimitri Tiomkin's score for the restored director's cut of *The Alamo* made this point time and time again. I even found the canon blasts and explosions convincing in this 1960 spectacular.

But in many modern action films, and even in intelligent character-driven vehicles such as *Apollo 13*, the Alóns simply aren't up to the task of reproducing highly dynamic and bass-heavy sound effects. A powerful amplifier helps, but even under the authoritative control of a Krell 300S, there is a limit to how loud and how low the Trio will go. I would not recommend

the Trio/C1 speaker system for use with most low-powered A/V receivers. These speakers benefit from the control offered by more powerful amplifiers and are transparent enough to reveal how bright and tonally unsatisfying most mass-markets electronics can be.

Back to first principles

Which brings me back to my original question: What do I expect from an A/V system? And how much of my expectation must be met to be "satisfying"? For me, the dialog and the *mise*

Measurements

The diminutive Petite is not very sensitive, 2.83V raising a calculated 83 dB at 1m (B-weighted). However, it is an easy load for an amplifier to drive, dropping below 8 ohms only in the midrange. The cabinet was generally lively in the 350–500 Hz region. No strong individual resonant modes could be found, however, which suggests an well-constructed cabinet.

The Petite's low-frequency output rolls off gently below 100 Hz, reaching the 6 dB-down point at a moderate 55 Hz; not bad extension for such a small speaker. The tiny port isn't profiled in any way; I noticed considerable chuffing and wind noise coming from it at even moderate levels when the speaker was driven by a pure sinewave. Luckily, music will offer some masking and the port does face the rear.

Though the Petite's overall response on the tweeter axis is smooth and even, there is a distinct step in the woofer's on-axis response between 1 kHz and 2 kHz. This response shape is almost always associated with a pronounced nasality to a speaker's sound, in my experience, so I was initially puzzled as to why WP didn't notice any excessive coloration. Then I read that he had to tilt the speaker backward quite a ways to get a balance he liked. The speaker's output in the region just above the response step increases by up to 5 dB for listening angles more than 15 degrees above or below the tweeter axis. The response on WP's preferred axis is pretty flat overall.

WP also commented on the Petite's fine imaging, which will be associated with the speaker's textbook lateral dispersion, the top two octaves gently rolling off with increasing off-axis angle, coupled with an excellent match between the woofer and tweeter dispersion patterns in the crossover region. Other than the on-axis step at 1 kHz, the Petite's cumulative spectral-decay or "waterfall" plot was simply superb, clean and free from resonant problems.

With its paired drive-units, the Alón C1 center speaker is a significantly harder load for an amplifier to drive than the Petite, its impedance dropping to around 3.5 ohms in the lower midrange. I would imagine that an inexpensive receiver would have a hard time with this speaker.

The response of the C1 is somewhat similar to that of the Petite—there is a response step in the upper midrange—but suffers from a severe lack of energy in the midrange due to the usual bipolar cancellation between the front and rear drive-units. (The C1's narrow baffle exacerbates this problem.) How much of a problem this will depend very much on the speaker placement and room furnishings, but voices could sound a little lightweight.

The C1 is also problematic in that when it is placed on its side, listening to it in front of the tweeter will give a rather sucked-out balance in the mid-treble due to crossover cancellation with the side-by-side drive-unit disposition. The flattest treble response is to be found a little to the side of the woofer. Vertically, however, the C1's sound doesn't change much.

One area where the C1 measures well, however, is in its cumulative spectral-decay or "waterfall" plot. This showed a very clean decay of the sound, unmarred by treble resonant problems. The response step in the upper midrange, however, was associated with a significant ridge of resonant energy. Again, I would have thought that this would have made the speaker sound nasal, but WP didn't remark on any problems in this region.

Finally, with its twin 6.5" drive-units the Alón PW1 really only qualifies as a *woofer* rather than a subwoofer. Its output starts to rollout below 42 Hz, the region of the lowest note of the double bass or 4-string Fender bass. It neatly fills in for an octave below the Petite and C1, however, and with an impedance dropping to just below 6 ohms, won't present amplifiers with any drive problems.

Summing up, the Petite is a well-engineered little speaker and, provided care is taken over what axis the listener listens on, should offer a neutral, well-balanced sound. The C1 appears to be a more idiosyncratic design, suggesting that extra care needs to be taken about placement and listening axis. Given my druthers, I would use a third Petite as a center speaker.

—John Atkinson

en scene—establishing the environment in which the film takes place—are crucial. If I can't understand what people are saying or if I can't lose the feeling of watching lights in a box, I can't be bothered. The Alóns do this as well as anything I've heard in my room.

Watching movies over at Tom Norton's house, I get to experience super-class home-theater systems that include components I can't imagine fitting in my house, much less affording. However, what I hear at Tom's does raise the stakes for the stuff I can afford, which leads me to expect a bit more bottom than the Trio/C1 system produces. Must I have an overwhelming train wreck every time I screen *The Fugitive*? I reckon not, but having heard it once, I sorta want it. But what about the bulk of the films I watch regularly?

In the last month, I've been doing a lot of critical listening to films, mixing

in old favorites with new stuff to keep me interested. Out of all that watching and listening, how many times did I notice the PW1 in distress? Well, in one scene of *Generations* (a film I'll never watch again) and the launch sequence in *Apollo 13*, but I'd rather watch that on one of TJN's projector rigs anyhow. Perhaps a total of five films out of the twenty or so I screened included material that brought me out of my movie reverie. When you consider that I only watched most of the offenders to find out what torturing the Alón system would reveal, I could live with that.

If I watched different films, or if I valued that kick-in-the-gut sensation more, I might come to a different conclusion. I certainly recommend that anyone looking for a speaker system, at any price level, should consider philosophical first principles and ask them-

selves what they want from a home theater and what they will use it for.

I like the Alón Trio/C1 system because it does what I mostly want a surround speaker system to do. I understand what the characters are saying and I believe (for the length of the film) in the place where they are saying it. If you require all this and you want more wham 'n' slam, perhaps you'd be better off considering the Petites/C1 system and adding one of the many superb powered subwoofers we've previously reviewed. I intend to check out such a combo as soon as I can get my hands on a big powered sub. But keep in mind that this option substantially increases the price of the system.

In the meantime, I think of the Alón system as a graceful sailboat skimming along the surface of the lake, like a bowling ball wouldn't. Just don't expect to bowl 300 with it. **SGHT**

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B&W 600 SERIES

SURROUND SPEAKER SYSTEM

Steven Stone

When I'm asked to review less expensive speakers, I usually pout a lot. But not this time. Even though the B&W 600-Series package is the least-expensive surround speaker system I've used in the last year, it's the kind of product that can make even a cranky reviewer smile. Well made, nicely finished, good sounding—this is the sort of system that may surprise you. Although it has its limitations (and what doesn't?), this moderately-priced surround package can play music that sounds like music.

What have we here?

Like most B&W loudspeakers, the 600 Series uses high-tech Kevlar mid/bass drivers and ferrofluid-cooled, aluminum-dome tweeters. All drive units feature die-cast basket construction for greater rigidity. Crossovers are first-order designs on printed circuit boards, and all models are equipped with 5-way, gold-plated binding posts and provisions for bi-wiring.

The cabinets feature rounded edges to minimize diffraction, and the reflex ports have flared entrances and exits for smoother air flow. The overall finish is good, featuring black-ash veneer cabi-

nets and removable black cloth grilles stretched over plastic frames.

The DM602 front left and right speaker has a single 1-inch dome tweeter coupled with a 7-inch mid/woofer in a ported box. The DM601, which serves as the rear speaker in this surround system, has the same tweeter coupled with a 6½-inch driver in a somewhat smaller, ported enclosure.

The CC6 center-channel speaker has the ubiquitous 1-inch tweeter coupled with a pair of 5-inch drivers and a central port. The CC6 is a low-profile design that sets up horizontally on top or just below your video monitor. Although it does not have a built-in angling feature, it is easy to shim the back or front to angle the speaker properly toward the listener.

The AS6 powered subwoofer uses a 12-inch, paper-cone, long-throw bass driver in a cabinet that features dual ports. The compact box includes a built-in 100W amplifier with phase, lowpass, and volume controls on the back. Along with the usual line-level inputs on RCA jacks, the AS6 also has speaker-level inputs and outputs on 5-way binding posts for use with a receiver that has no line-level output.

DM602 (front L&R)

Driver complement: one 7" Kevlar mid/bass and one 1" metal-dome tweeter
Frequency Response: 52 Hz–20 kHz, ± 3 dB
Crossover Frequency: 3 kHz
Dispersion: within 2 dB of response on reference axis; horizontal over 40° arc, vertical over 10° arc
Sensitivity: 90 dB SPL (2.83V, 1m)
Nominal impedance: 8 Ω (4.3 Ω min.)
Power handling: 25–120W into 8 Ω
Dimensions: 19.375" x 9.25" x 12" (HxWxD)
Weight: 21.6 lbs.
Ser #: 003826, 003825
Price: \$550/pair

CC6 center-channel

Driver complement: two 5" Kevlar mid/bass and one 1" metal-dome tweeter
Frequency Response: 78 Hz–20 kHz, ± 3 dB
Crossover frequency: 3 kHz
Sensitivity: 90 dB SPL (1 watt/meter)

Nominal impedance: 8 Ω (6.4 Ω min.)

Amplifier requirements: 25–120W into 8 Ω

Dimensions: 6" x 17.75" x 10.875" (HxWxD)

Weight: 13.9 lbs.

Ser #: 003020

Price: \$350

DM601 (surround)

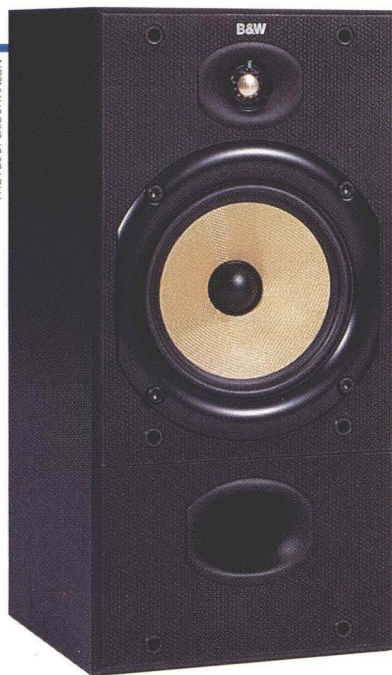
Driver complement: one 6.5" Kevlar mid/bass and one 1" metal-dome tweeter
Frequency Response: 70 Hz–20 kHz, ± 3 dB
Crossover frequency: 3 kHz
Dispersion: within 2 dB of response on reference axis; horizontal over 40° arc, vertical over 10° arc
Sensitivity: 88 dB SPL (2.83V, 1m)
Nominal impedance: 8 Ω (4.2 Ω min.)
Amplifier requirements: 25–100W into 8 Ω
Dimensions: 14" x 8" x 9.83" (HxWxD)
Weight: 13.4 lbs.
Ser #: 004803, 004804
Price: \$400/pair

AS6 active subwoofer

Driver complement: one 12" long-throw with magnetic shielding
Frequency response: 30 Hz to 40/140 Hz adjustable, ± 3 dB
Power Output: 100W continuous
Input impedance: 5 k Ω
S/N: 90 dB
Dimensions: 20" x 17.75" x 17.88" (HxWxD)
Weight: 52.8 lbs.
Ser #: 000915
Price \$699
Total System Price: \$1999

U.S. Distributor:

B&W Loudspeakers of America
54 Concord Street
North Reading, MA 01864-2699
tel. (800) 370-3740 or (508) 664-2870
fax (508) 664-4109

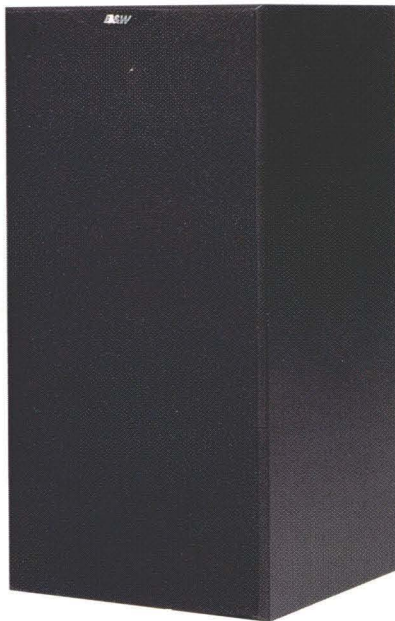


Unlike many mid-priced subwoofers, the AS6 has a built-in high-pass filter to relieve the satellites of low-frequency responsibilities. If you have a preamp with line-level outputs, you can also use the AS6 as a crossover control for the satellite speakers via pairs of RCA inputs and outputs. Of course, the AS6 also fits neatly into a THX-type system, in which it receives the mono subwoofer output from a surround processor. This was the setup I used during testing.

What went where

As with all my surround-speaker system reviews, the B&Ws were auditioned in my small video room. The room is approximately 17 by 12½ feet, with an 8-foot ceiling that vaults up to a 15-foot-high pyramidal skylight in the center. The left and right speakers were just over 7 feet from listening position, with their front baffles 46 inches from the back wall and 55 and 57 inches from the side walls, respectively.

I tried several different stands with the DM602s and settled on a 29-inch-high model from Sound Design. The 602s sound best with their tweeters well above ear level, and the 29-inch stands raised the tweeters 47 inches off the ground and 7 inches above ear height; the woofers ended up exactly at ear level. This height seemed to fur-



nish the best blend between drivers. You get more top-end extension with a shorter stand, but the speaker also sounds rougher during dynamic peaks.

The center speaker was placed on top of my monitor, slanted forward about 15 degrees. Its tweeter was located only 7 inches higher than the front speakers' tweeters. The AS6 subwoofer's front baffle was 34 inches away from the back wall; its side was 58 inches away from the nearest side wall.

The DM601 surround speakers were located behind my ears, angling toward the center of the room with the front baffle 17 inches from the rear wall. The tweeter was 68 inches off the floor and 5 feet away from my ears. I mounted the rear speakers on B&W-supplied, multi-directional wall brackets (very similar to

those made by Target), which were a joy to use.

One final fillip on this setup was that the DM601s were mounted "upside-down," with the tweeter closer to the floor. This was done to keep the tweeter farther from the ceiling's early reflections, permitting more even free-air dispersion.

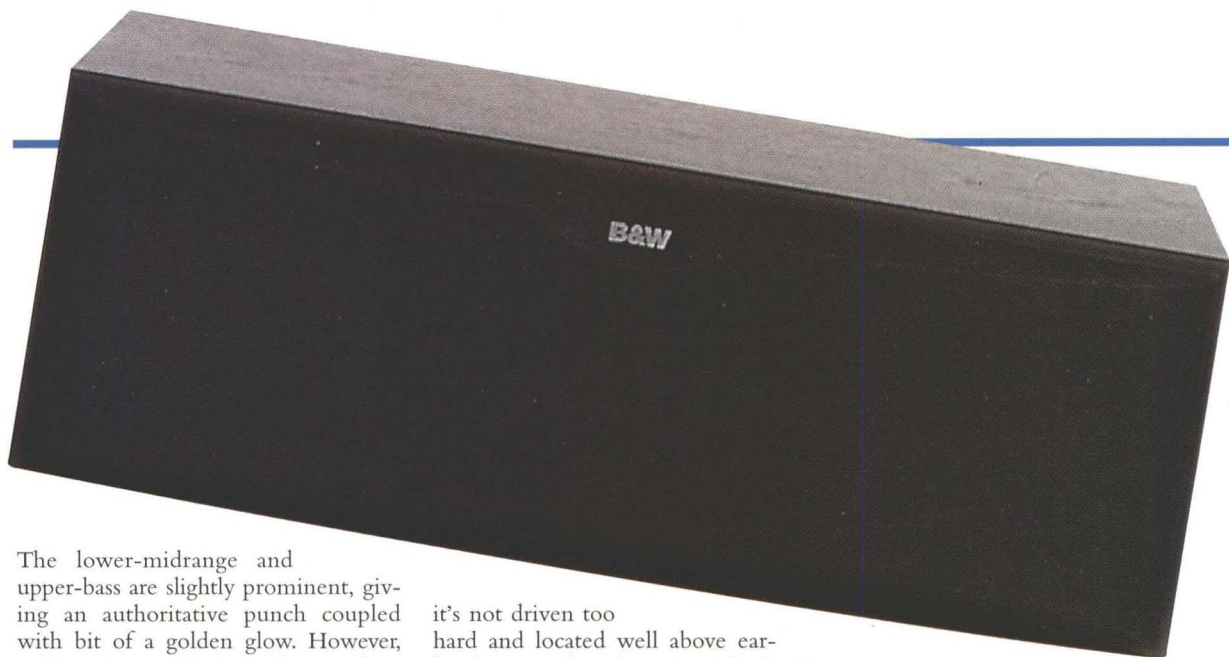
What's that sound?

When I first received the B&W system, I didn't know its actual tariff. Several weeks after the speakers arrived, *SGHT* Editor Lawrence Ullman asked me how much I thought they cost. I guessed almost \$1000 more than the actual price.

How come? Unlike many entry-level surround systems, the 600s don't sound thin, brash, or excessively hi-fi-like. Perhaps this is because these speakers were not designed solely to serve as part of a home-theater system. They were made to reproduce music, not just train crashes. As long as they are not pushed too hard (these are definitely not THX-certified transducers), the B&W system sounds quite warm, natural, and—dare I say it—musical.

If I had to characterize the 600s' sound in one word, it would be "friendly." The system is slightly warm-sounding, with a smooth, inviting midrange.





The lower-midrange and upper-bass are slightly prominent, giving an authoritative punch coupled with bit of a golden glow. However, unlike other small, 2-way box speakers whose low end is similarly bumped-up, the DM602s still wed quite nicely with the AS6 active subwoofer.

The subwoofer itself is also on the warm and amicable side of neutral. While not as fast, well-defined, or tight as subwoofers from Atlantic Technology, Triad, or Paradigm, it is not Saint-Bernard-sloppy, merely Forrest-Gump slow, with less bass definition than the others.

On material such as the English heavy-cavalry charge in *Braveheart*, the AS6 acquitted itself quite admirably. Hooves rumbling, ground trembling—it got my cats rather agitated, looking about for manes and tails. The bass was acceptable on musical material such as Toy Matinee’s “Last Plane Out,” albeit a bit fatter and slower than it should be. However, it was never so loose as to be disturbing.

The metal-dome tweeter on the DM602 front and CC6 center speaker is pretty good, but not great. As long as

it’s not driven too hard and located well above ear-level, it sounds rather nice. I doubt it’s reproducing much above 14 kHz, so there isn’t as much air as with the Triad Gold LCR speakers [reviewed by SS in our Summer 1996 issue, Vol. 2 No. 2—Ed.] or my reference Avalon Eclipses. (Of course, these speakers cost way more than the entire B&W system including the powered sub, so they had *better* sound better!)

I also suspect the tweeter has a few hot spots somewhere in the 4 to 8 kHz region. At normal levels, female vocals and massed strings have a bit of extra sheen that is not unpleasant. At high levels (above 88 dB SPL at the listening position), the sheen turns into a bit of glare, and by 91 dB SPL music and dialog become hard and acquire an electronic edge.

On natural, well-recorded classical offerings with a wide dynamic range (such as the latest *Stereophile* release, *Festival*), the deterioration from pleasant and natural to hard and glary is es-

pecially noticeable. But if your room is small and you’re not prone to reproduce music at authentic orchestral levels, you’ll probably be far less bothered by this problem than I am.

I was pleasantly surprised by the excellent low-level detail exhibited by the B&W system. On *Stereophile’s Festival* CD, it was easy to hear the 120 Hz background hum during the quiet passages of Tomiko Kohijba’s *The Transmigration of the Soul*, and to locate the sneeze at 16:15 into Aaron Copland’s *Appalachian Spring*.

On busy, densely-packed soundtracks, such as *32 Short Films about Glen Gould*, in which several voices talk at once, the B&W system never became muddy nor the dialog indecipherable. Only when the volume level creeps up to nearly THX levels does the 600 Series system lose its fine inner detail and resolution.

The 600 Series system does surprisingly well at portraying dimensionality. Not only does it image well, but it can

Review System

Components in the review system included 5 Marantz MA-500 THX-certified monoblock amplifiers driving the 5 main channels. The surround processor was a Harman Kardon Citation 7.0.

Video gear included a Proton VT-331 31-inch monitor, Denon LA-3500 laserdisc player, Fisher FVH-8901 Hi-Fi VCR, and Sony SLH-900 Beta VCR.

The digital front-end employed an EAD DSP-7000 III DAC with a TEC TL-2 CD transport. An Audio Alchemy datastream transmitter carried the Denon laserdisc player’s digital output to the EAD DAC. The analog front-end consisted of a VPI HW-19 series IV turntable with Clearaudio/Souther TQ-1 arm and

Denon/van den Hul 103C cartridge. The turntable was mounted on a Bright Star J-7 base sitting on a RoomTunes Just-A-Rack and connected to either a Gold-Aero dB-45 or Michael Yee PFE-1 phono preamp. THX-certified interconnects and speaker cables used during the review were from XLO and Monster Cable.

Room-treatment devices included Tube Traps and Shadowcasters from ASC, and CornerTunes, SideTunes, and RoomTune panels, and custom-made ceiling clouds from Michael Green Designs. Other accessories included Sound Design model SS-7 speaker stands, an Arcici Super-structure II equipment stand, a Soundstyle equipment stand, Bright Star Big-Rock isolation bases under most components, and copious amounts of Fat Tire Ale.

deliver a reasonable sense of depth on some material. While not as precise in lateral imaging as the Triad Golds or Kenwood LS-XIF speakers (both of which are symmetrical-array designs), the 602s still do a good job of localizing individual sounds, and of creating a respectably wide soundfield.

On laserdiscs such as *Casper*, the B&W's were capable of producing a convincing soundscape of whirling phantasmagoria. Even off-center dialog and sound effects are placed accurately across the front of the stage. On minimally miked recordings—such as the aforementioned *Festival* or JGH and my DAT recordings of the Boulder Philharmonic Orchestra—the 6-axis mode on the Citation 7.0 surround processor fed into the B&W system produced a very realistic three-dimensional soundstage. During applause, it was

eerily similar to being in a real audience.

The CC6 center-channel speaker mates rather well with the DM602 front speakers. While there are some spectral differences when the center speaker is switched in and out, the harmonic variation is no greater than I've heard with other, more expensive systems. On music, I prefer the sound of the DM602s sans the CC6 center channel. Depth and three-dimensionality improve when the center channel is turned off.

Although the CC6 is magnetically shielded and didn't cause any color-shifts on my direct-view TV, I did notice one peculiar phenomenon. When placed on top of my Proton monitor, the CC6 emits a slight motorboatlike, low-level buzz when the TV is turned on. Even more bizarre, this phenomenon persisted even when I disconnected the speaker from the power amp. Odd, huh? Where's Mr. Wizard when you really need him?

What's the bottom line?

B&W is perhaps better known for high-end flagship "statements," such as the \$38,000 Nautilus and \$15,000 Matrix 800s, than for their moderately priced offerings. Products like the 600 Series might help change this perception. While not perfect (no speaker is), this B&W system performs nicely as long as it is not pushed to excessive volume. If overdriven, it loses much of its warm, natural charm, and becomes hard and a bit nasty. It also sounds best when the tweeters are placed well above ear level.

The 600 Series' excellent resolution and low-level detail make it ideal for small-room installations that must reproduce movies and music with equal aplomb. If I had a budget of \$2000 for a complete surround speaker set-up, I would certainly include the B&W 600 Series on my must-audition list. **SGHT**

Measurements

With a dip to just below 5 ohms in the lower mids and 4 ohms in the high treble, the DM602 is a moderately demanding load for an inexpensive receiver but it will work well with any amplifier rated into 4 ohms. And its high 89.5 dB estimated sensitivity means that this big-hearted speaker will play loud with only a moderate number of amplifier watts! The impedance traces suggest the presence of some cabinet resonances: an accelerometer did reveal that the back and top panels were quite lively in the 280 Hz region.

The 602's big-hearted nature was also apparent from its anechoic response, where a relatively high peak in the upper-bass could be seen. However, this was balanced by a slight energy excess in the high treble. The midrange and low-treble regions were admirably flat, while the bass went low, with a -6 dB point around 36 Hz.

The speaker proved quite beamy in the vertical plane: the listener gets the most neutral balance sitting within 5 degrees of the tweeter axis; sit above or below that region and suckouts appear in the crossover region. Laterally, the use of a relatively large-diameter woofer means the speaker also gets beamy in the low-treble, before the drive-unit hands over to the wide-dispersion tweeter.

The DM602's cumulative spectral-decay or waterfall plot was impressively clean from resonant overhang in the upper midrange and treble, correlating with SS's noting that speaker was capable of producing fine inner detail.

SS also noted that the CC6 center speaker matched the DM602 side speakers well. Given the completely different drive-

unit complement and layout and the different cabinet, the CC6's measured performance was astonishingly close to that of the bigger speaker. The waterfall plot was similarly clean, the anechoic response was very similar, though with a greater energy excess in the high treble and a less-exaggerated upper bass. Other than a dip to 4 ohms in the top octave, the CC6's impedance was benign, averaging 8 ohms or above through most of the audio band. Coupled with a high 89 dB/V/m estimated sensitivity, this little speaker will play loud with low-powered receivers.

Looking at the CC6's vertical dispersion, B&W's designers have appropriately arranged for the speaker's balance not to change too much as long as the listener is sitting on or below the tweeter axis, as might be expected for a speaker sitting on top of a TV. A big crossover suckout appears if you listen above the speaker. Laterally, the use of spaced twin woofers gives rise to comb-filter effects in the midrange for listeners much to the sides.

Finally, the back panel does have one main resonant mode, at 120 Hz, which might add a feeling of upper-bass congestion at high levels, but the cabinet otherwise appears to be rigidly constructed.

As I have come to expect from B&W, the DM602 and CC6 appear to be well-engineered speaker designs, with the performance compromises inevitable at this price level well arranged to interfere minimally with music or movie soundtracks.

—John Atkinson

SURROUND SPEAKER SYSTEM

Michael Fremer

“The government doesn't create wealth, it only spends it.” That's a conservative mantra you often hear when anyone to the left of Ghengis Khan dares suggest a collective “investment” in America's future.

Whenever someone hurls that line at me, I tell them to take a Canadian chill pill and consider the National Research Council (NRC) in Ottawa. This ambitious and expensive Canadian government-sponsored project conducted, among other things, a massive study on the science of sound.

The fruits of that research, along with the superb testing facilities (including a gigantic anechoic chamber) bought by the infusion of government cash, helped jump-start today's highly successful Canadian loudspeaker industry, giving it what some consider a big advantage over its American competition. Jobs and a net inflow of cash followed.

If you want to know why the Canadian presence in the American

speaker market has grown so impressively over the past decade and a half, look to that “tax and spend” policy and you'll see the results: flourishing companies like Paradigm, PSB, and API, the designer and manufacturer of Energy, Mirage, and Sound Dynamics speakers. Government created wealth? You bet your frozen tundra!

Take a bow and do it again

In the case of API's success, it doesn't hurt to have a brilliant designer like John Tchilinguirian in-house. His Energy RVS home-theater system has been my reference for the past two years. The compact RVS system (LCR, surrounds, subwoofer, and metal stands) offers an unbeatable combination of stunning sonic performance, outstanding build quality, and compact, living-room-friendly, high-gloss black good looks, all for \$2420.

So what does Tchilinguirian do for an encore? He comes up with this Sound Dynamics system, which sells for \$1780 without stands. In the rar-

THC-2 LCR front speakers:

2-way, dual-ported,
bass-reflex loaded, video shielded
Driver complement: two 5.25"
bass/midrange polypropylene cones with
butyl rubber surrounds, one ¾" dome
tweeter

Efficiency: 90 dB @ 2.83 volts/1m
Frequency response: 45 Hz–22 kHz, ±3 dB
Nominal impedance: 8Ω
Amplifier requirements: 15–175W
Dimensions: 7.5" x 11.75" x 21" (WxDxH)
Weight: 23 lbs.
Ser. #: 5274, 5236, 5267
Price: \$300 ea.

THR-BP-1 bipolar

surround speakers:
2-way, bass-reflex loaded
Driver complement: two 5.25" polypropylene cones with foam
surrounds, two ½"
titanium-coated dome tweeters
Efficiency:
89 dB @ 2.83 volts/1m
Frequency response:
80 Hz–20 kHz, ±3 dB
Nominal impedance: 8Ω
Amplifier requirements: 15–100W

Dimensions: 10.5" x 6.5" x 10.25"

(WxDxH)

Weight: 12 lbs.

Ser. #: 5391, 5392

Price: \$165 ea.

THS-10 powered

subwoofer: 1-way, dual
ported

Driver complement: one
10" forward-firing woofer

Frequency response:

35 Hz–150 Hz, ±3 dB

Power output: 100W RMS

@ 0.04% THD, 400W

instantaneous peak

Crossover: continuously

variable lowpass filter;

50–150 Hz (18

dB/octave)

Inputs: stereo line-level

(RCA jacks)/stereo speak-

er-level (spring-clip con-

nectors)

Dimensions: 16.5" x 14.38" x

15.75" (WxDxH)

Weight: 40 lbs.

Ser. #: 078805

Price: \$550

Manufacturer:

Sound Dynamics Speakers

3641 McNicoll Avenue

Scarborough, Ontario, Canada M1X 1G5

tel. (416) 321-1800

fax (416) 321-1500



THS-10 powered subwoofer

efied world of high-end audio/video, the \$600-plus difference between the two systems doesn't add up to much, but for folks on a budget, it means a decent A/V receiver thrown in for free.

But where did the designer cut corners to get the price down? Not in performance, believe it or not. Although the strengths and weaknesses of the two systems are different, their overall performance is roughly comparable. The biggest differences are in fit and finish.

The Sound Dynamics system consists of three THC-2 speakers for the front (a company spokesperson expressed surprise when I told him that THC is the active ingredient in marijuana), a pair of THR-BP-1 units for the surrounds, and a THS-10 subwoofer.

The THC-2 front speakers are taller and somewhat narrower than the comparable Energy boxes, and they actually go down a bit lower to 45 Hz (3 dB down point), which is about 2 Hz lower than the Energy speakers. The THC-2's usable response goes down to about 35 Hz, and the high-frequency response extends out to 22 kHz.

Two 5¼-inch bass/midrange drivers are shielded and feature injection-molded polypropylene cones with butyl rubber surrounds. The ¾-inch multi-laminate dome tweeter is ferrofluid-cooled and offset-centered. Highly efficient and robust (90 dB @ 2.83 volts/1m), the 8Ω THC-2s can be driven by as few as 15 watts and as many as 175.

Each compact THR-BP-1 bipolar surround unit features a pair of 5¼-inch polypropylene cones with foam surrounds, plus a pair of ½-inch titanium-coated dome tweeters. Each woofer/tweeter duo fires from oppo-

site ends of the box. The THR-BP-1 includes a convenient, integral wall-mounting device.

The diminutive THS-10 subwoofer features a forward firing, twin front-port-loaded, 10-inch cone, driven by a 100W discrete MOSFET amplifier. Low-end frequency response is conser-

of the front baffle. Placed vertically for L/R use, the tweeters should be oriented toward the center to minimize side-wall diffraction. The only problem with this setup is that the Sound Dynamics logo reads sideways. Can you live with this? If you want high performance at a low price, you can.

You must also live with thinner-walled cabinetry and a matte-black finish (gray front baffles behind black cloth grilles) instead of high-gloss black. The Sound Dynamics units don't look bad, it's just that the Energy speakers look great! In any event, the SD speakers look far better than you'd expect for the money.

One clear cost-cutting measure is the use of toy-like, 5-way binding posts, the kind with brittle plastic nuts that never seem to stay snugged down but crack if you torque them. Again, can you live with them to get really high performance at a ridiculously low

price? I think so. And if you're handy with a soldering iron, you could probably replace them. At least the THC-2s don't come with spring-clip "guillotine" connectors. (Off with the heads of manufacturers who use them!)

The THR-BP1 surround speakers are small, unobtrusive, matte-black or white boxes (your choice). Although far less impressive looking than the elegant 6-sided Energy RVSS, they cost \$220/pair less. The "Thunder Series" subwoofer is smaller and less versatile than the Energy low-frequency unit, and it doesn't go quite as low, but it costs \$120 less.

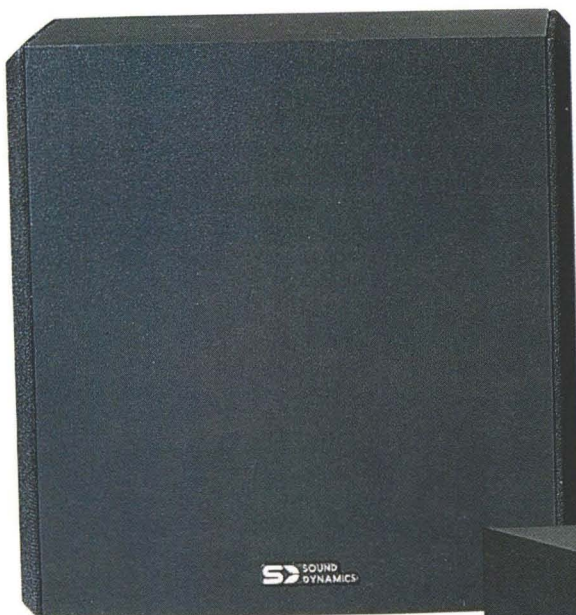


THC-2 LCRs

vatively rated at 35 Hz. The sub accepts speaker- and low-level inputs and features both variable-frequency lowpass filter (18 dB/octave) and level controls. Unlike many other competing models, there's no phase or "audio/video" switches.

Downpricing without downsizing

Whereas the Energy system differentiates driver placement for the center and L/R speakers, the three front Sound Dynamics units are identical. Placed horizontally on top of a monitor for center-channel use, the THC-2's tweeter is centered toward the top



The free receiver costs how much?

So you give up some gloss and physical finesse with the Sound Design system, but how much sonic performance do you give up? Since API manufactures both products, it can't lose here, but the company folks might not be happy to hear that, in some ways, I prefer the sound of the Sound Dynamics system to the Energy.

I broke the speakers in for a few weeks using my Marantz SR-92 receiver/Muse 100 front-channel amp combo. Granted, this is better than any \$600 receiver you're likely to find, but still within reason for a \$2000, 6-piece, surround speaker system.

Which brings up one of my misgivings about using a "home-theater" system for music: For \$2000, you can choose among many fine-sounding stereo speakers, but no multi-speaker home-theater system at that price

point offers what I consider to be high-end performance.

While I sometimes spend weeks trying to find the ideal place to park stereo speakers in my basement audio room, the choices are more limited in my home-theater *am* living room. Every inch of the downstairs room is devoted to music, whereas my moderate-sized living room is a real-world space that must

well-focused, and dynamic home-theater sound.

Out of the box, the THC-2s sound surprisingly open and free of "hooty" midbass colorations. However, they also sound "tight." After the woofer surrounds have a chance to flex a bit, the soundstage opens up and a sense of ease and reserve takes over.

Blending the subwoofer with the front channels proved to be relatively easy because the THC-2's 45 Hz low-end limit (3 dB down) is well matched to the 50 Hz lower limit of the sub's lowpass filter. I got the best blend with the filter set to minimum and the output level cranked about halfway up.

At these settings, male voices have a pleasing, natural quality: warm on the bottom without excessive "chestiness," a nice sense of throat and head, and cleanly rendered sibilants. All of these characteristics add up to high intelligibility, which is a prerequisite for good home theater. The midrange is slightly recessed and the lower midbass is slightly bloated, but given their reasonable price, the THC-2s score high in this all-important area.

On 2-channel music, such as Doug MacLeod's natural-sounding *Come To Find* (AudioQuest 1027), the THC-2s offer fine dynamic performance—especially on the bottom—with good sock to the kick drum and outstanding focus and control to the upright bass. Acoustic guitar has a vibrant string ring, though the sense of the wooden body is lacking compared to megabuck systems; no surprise there. Highs are smooth and extended with no harshness and a minimum of grain and glare.



THR-BP-1 bipolar surrounds

accommodate a wife, dogs, and furniture. Nevertheless, although placement in my living room is less than ideal, both the Energy and Sound Dynamics systems managed to create spacious,

Review System

ProScan 27" monitor
Marantz SR92 receiver
Muse Model 100 power amp
Enlightened Audio T-7000 laserdisc player
Aragon D2A Mk2 digital-to-analog converter

Toshiba M-650 HiFi VCR
Townshend Seismic Sink (under T-7000)
Kimber 8TC speaker cable
StraightWire Maestro interconnect cable

Overall, I am very impressed with the timbral correctness of this inexpensive system. Top-to-bottom balance is hardly neutral in the high-end audio sense, but it's very satisfying on a wide variety of music. I suspect measurements will show a moderate suckout (dip) in the midrange area and a bit of bloat in the midbass, which is probably a result of cabinet resonances. In a product designed around a very low price point, compromises must be made, and the designer chose wisely here.

The Energy system offers a more neutral, harmonically correct overall sound with fewer obvious resonant anomalies, thanks to its higher-quality cabinetry and drivers. However, I found the imaging and soundstage characteristics of the Sound Dynamics speakers superior to those of the Energys when used as a stereo pair.

While they are perhaps not quite as well-focused, the SD pair create a wider, deeper soundstage, and do a much better job of disappearing in my room. Stage height, my major reserva-

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tion regarding the Energy system, is outstanding with the SD pair, which produce a big, airy space across the front.

After auditioning a wide variety of music on the SD front speakers with a subwoofer, I ran downstairs and played the same selections on my audio system, which costs over eight times as

much for two channels. Of course it's unfair, but I wanted to hear what all that extra cash gets me (if anything). The answer is *plenty*, especially in terms of low-level dynamics and resolution. The SD system provides only the barest outlines of the musical event. Below the basics, the bottom drops out. But hey, the cables connecting my audio gear cost twice what the entire Sound Dynamics system does.

What about movies?

Fortunately, low-level resolution is not that important in motion-picture sound (at least, in my opinion). There are no "purist" soundtracks, no "two-mike" jobs, no sound of a movie playing live in a natural acoustical space. There *are* some great-sounding music scores, especially those recorded by Shawn Murphy, who records mostly to analog using only a few microphones. (He often supervises the soundtrack CDs generated from his master tapes, and these tend to sound superb as well.) However, by the time the music

Measurements

Intended to be used as side and center speakers, the inexpensive Sound Dynamics speaker appears from its measurements to be well-engineered. Its impedance drops to just above 4 ohms in the midrange, though the moderate phase angle and the reasonable estimated sensitivity of 87.5 dB/W/m suggests that this speaker shouldn't present 4 ohm-rated receivers with any drive problems.

The anechoic response on the tweeter axis is smooth and even, though it does slope down a little in the treble. The upper-bass measures as being slightly full, correlating with MF's noting that the THC-2 had a "warm" balance, with

"a bit of bloat in the midbass." MF also conjectured that this character might be due to cabinet resonances: though the side- and top panels had some low-level modes present, the back panel was the liveliest, with a strong resonance apparent at 140 Hz. This is not bad cabinet behavior; however, for an inexpensive design.

I was intrigued by the fact that the THC-2 is intended to be used in both vertical (L/R) and horizontal (center) configurations. The response doesn't change much either side of the narrow baffle, other than the high treble smoothly rolling off with increasing off-axis angle. This will make toe-in for the side speakers and vertical listening axis for the center speaker relatively uncritical. It also ties-in with the Sound Dynamics' excellent stereo imaging.

Either side of the cabinet's long dimension, however, the spaced woofers give rise to cancellation notches in the midrange. As with the vertically oriented speakers, this should not be a sonic problem in all but very live rooms, but you shouldn't sit too far to the sides of a horizontally oriented center speaker. I do wonder, though, if this dispersion behavior (similar to that of typical THX speakers) was associated with MF's feeling that the midrange lacked energy in-room.

Finally, the THC-2's waterfall plot was very clean for such an inexpensive design. Those Canadians obviously know how to design for maximum performance at the minimum price!

—John Atkinson



Sound Dynamics

track has been processed and re-recorded into the final soundtrack, the resolution—the rendering of low-level musical, spatial, and dynamic details—has been compromised.

All motion-picture soundtracks are cobbled together from disparate parts. Dialog is patched together from various takes and mostly re-recorded in an automatic dialog replacement (ADR) studio. There are many sound-effect tracks, Foley effects (foot steps, leaves rustling, doors closing, keys rattling, etc.), ambient tracks, music, etc. Unless you want to hear the mix break down into its composite parts, the last thing you want is ultrahigh resolution.

I rounded up all the usual sonic suspects to evaluate the SD system (*Fugitive*, *Terminator 2*, *Clear and Present Danger*, etc.). I also watched the recent Image THX edition of *Tron*. I supervised the soundtrack of that grand flop, and I know every sound in it, how it was recorded, and how it was mixed.

Reproducing the *Tron* soundtrack, the SD system is impressive on all counts. Spatially, it does a nice job of rendering the electronic ambient textures you hear throughout the film, suggesting the giant electronic bubble we tried to create. Some of the music was recorded at the famous Walthamstow Town Hall outside of London. Even when mixed with dialog and sound effects, the Town Hall space should be heard reverberating behind the musicians. With the SD system, it is.

Pans across the front of the soundstage are accomplished seamlessly, with focused images moving smoothly and not jumping from speaker to speaker. But coaxing a big ambient cushion from the SD's rear speakers is far more difficult than with the Energy's RVSS surround speakers. This is hardly surprising, since the RVSS is the best surround-sound speaker I've ever heard.

Ideally, the THR-BP-1s should be sidewall mounted with the "null" of each unit opposite to the listening position. This can't be done in my room, so the surrounds sit on stands behind the couch in the corners of the room. You can just plop the RVSSs

This inexpensive system can deliver the spatial, timbral, and dynamic goods in a small-to medium-sized room.

onto the stands and they disappear, leaving a giant cushion of diffuse sound. The THR-BP-1's required a great deal of twisting, turning, and repositioning to get the same effect. Once they were properly spaced and turned, they proved very capable and convincing, successfully blending with the front soundfield.

I measured the subwoofer's response into the mid 20-Hz range, but it simply can't reproduce the very lowest frequencies with authority. For example, the giant door opening in *Tron* should rumble and shake your room as if a subway train was passing through. Still, it offers surprisingly good transient definition and punch, and except for the lowest subterranean reaches, it holds together as a very dynamic and musical sounding product that can play loudly without breaking up.

Overall system dynamics are pretty good; I watched *T2* at way over 100 dB SPL, and the system managed to scale extra-high dynamic heights when asked to. However, I could hear lots of air belching (or "chuffing" as *Stereophile* Editor John Atkinson likes to call it) from the THC-2's front-mounted ports when the action got heavy. While the Energy system delivers more control and ease dynamically, the SD system careens pleasantly over the double yellow line, never totally losing it.

The Sound Dynamics system couldn't literally shake my house like the authoritative Infinity setup I had in for review a few years ago. The giant oak-veneered subwoofer in that system (which you could use as a coffee table) features two 12-inch, servo-controlled, graphite-composite cones driven by a 300W amplifier and costs as much as the entire Sound Dynamics system! Nonetheless, if you must be overwhelmed by a movie soundtrack to be convinced, this inexpensive system can deliver the spatial, timbral, and dynamic goods in a small- to medium-sized room.

The Sound Dynamics system's faults are mostly subtractive and unobtrusive, which is quite an achievement given its modest price. I lived with it happily for months, watching both broadcast television and movies almost every day.

Compared to what I demand from a 2-channel music system, my home-theater tastes, needs, and expectations are clearly more pedestrian and modest. Nonetheless, I'm acutely aware of what I'm listening to; I'm habituated to good sound. I could fire up this modestly priced system, forget about it, and remain satisfied, which says a great deal about the superior performance of the Sound Dynamics Theatrics system. I probably would have bought it if I hadn't already purchased Energy's more expensive offering.

Conclusion

If you haven't read my review of the Energy RVS system in *The Perfect Vision* or Robert Harley's in this magazine (Fall 1995, Vol. 1 No. 2), you might wonder why I've dwelled on the comparison here. Both RH and I—and many other reviewers—consider the Energy RVS system to be a fine performer without regard to price. At \$2420, it's one of the—if not *the*—best value among surround speaker systems.

Now, Sound Dynamics delivers a system that, while not quite as visually attractive, offers what I consider to be comparable performance for over \$600 less. Draw your own conclusion. Mine is, if you're getting into home theater and you're on a tight budget, start here and get your receiver for free! **SGHT**

MANUFACTURERS' COMMENTS

Proton WT-3650

Editor:

As usual, Mr. Johnson writes a very thorough review. However, there are a few areas that warrant clarification.

First, the sample of the Proton WT-3650 34-inch analog direct-view widescreen monitor/receiver that Johnson reviewed was one of the first of such units to enter the U.S. As a matter of fact, it is the first unit to be reviewed by any publication. Because of its unique operation, we offered to explain to Johnson how the WT-3650 might best be used. However, since he was very busy at the time, we were unable to connect.

There seemed to be some confusion on the usefulness of certain features and operating modes. This would be a good time to explain how the set can be used to its fullest potential. The WT-3650 is definitely designed to be used by videophile viewers that watch widescreen movies. Its primary purpose is to view widescreen programs that are framed in aspect ratios of 1.77:1, 1.85:1, 2.35:1, and a range of other ratios that are designated by the software producer. Its use to view a standard 4:3 picture is secondary.

If the consumer's viewing habits are primarily in the 4:3 aspect ratio, this is definitely the wrong set for them. Proton builds a line of TVs in the 4:3 aspect ratio, including a 35-inch model that would better serve their needs. On the other hand, if the consumer watches a lot of widescreen movies or DSS broadcasts, the WT-3650 could be just the answer.

Mr. Johnson stated that a 4:3 image was geometrically distorted with actors having "broadened foreheads," etc., when the set was clicked into the "Full" mode. Well, not exactly. The "Full" mode is designed to stretch the sides of the picture more than the center, leaving the majority of information close to geometrically correct, while stretching the side information disproportionately. After all, the picture has to be stretched somehow, and of course the user can leave the 4:3 image intact in the center of the screen. Remember, the set is designed primarily for watching widescreen material.

The purpose of the Horizontal and Vertical zoom feature is to allow the user to adjust the widescreen format to whatever aspect ratio material they are watching and get rid of the dreaded "black bars." On a 1.77:1 movie, no change is

necessary, and on a 1.85:1 movie very little change is needed.

There seems to be considerable confusion about the color-temperature settings that come preset from the factory. In addition, Proton was slightly misquoted in the review. Proton in fact told Mr. Gannon that the Natural setting should be in the 9300° Kelvin range, that the Warm setting should be about 6500°, and the Rich setting should be about 11,000°. Proton also said that the ISF adjustment should be done on the Natural setting to bring it into tolerance at about 9300°, and the rest of the settings would follow. Proton did *not* tell Mr. Gannon to adjust the Natural setting to 6500°. If in fact he did this, it would bring the Warm setting down to about 5200° and would make the picture look very dark and washed out in any room lighting conditions other than optimum.

Since Proton is one of the few companies to preset color temperature to consumer's personal selection, some of this problem could have been eliminated if Johnson had made his color-temperature preferences known to Proton before the unit was shipped.

As for PTV (projection televisions) being "...the fastest-growing segment of the television market," not everyone likes the images on projection sets or has room for them. There will be at most only one million PTV units sold in the U.S. during 1996 and there were 820,000 sold last year. That could be a 22% increase of a very small number. Meanwhile, 26 million direct-view sets will be sold during the same time. Simply put, PTV is not the only home-theater action; direct-view is.

Chuck Garland
National Sales Manager
Proton Corporation

NAD 216THX and 214

Editor:

Thank you for your thoughtful assessment of NAD's 214 and 216THX power amplifiers. NAD welcomes the ongoing critique of its products, both positive and negative. Ordinarily, it is ourselves we find to be the most difficult to satisfy.

On the subject of this specific review, we find ourselves disappointed, not in consideration of the outcome of the review, but because this particular review has, in our opinion, not been carried out in the usual professional manner.

To be more specific, the statement "the 216's and 214's specifications reveal that their power output does not quite double in an inverse relation with impedance" can be read as to suggest that NAD's claims regarding stiff power supplies are dubious. There are in fact few competitive amplifiers that will match the healthy power increases in lower impedances (a characteristic of stiff power supplies) of either the 214 or 216THX, particularly in their respective price ranges.

We also fail to see the relevance of the comparison of a 2-channel amplifier with a 5-channel amplifier when only two channels are driven. It is well-known that multichannel designs typically exceed performance expectations when not fully loaded. This comparison is therefore misleading and meaningless to the consumer.

Nowhere in the description of the subjective performance is it described what the 216THX actually *sounds* like. Neither is ancillary equipment discussed. We can only conclude that within the narrow context of two systems, another amplifier is preferred over the 216THX, and that the 214 is preferred over the 216THX.

The review's findings do not match our own, nor does it match the response of our customers. Actually, they are 180 degrees opposed, as the 216THX is the best-selling power amplifier NAD has ever built. Ordinarily we don't quibble; whatever one says, personal taste will always play a significant role. Any *Stereophile* review of a NAD product in the past has always been very thorough, in both its subjective and technical sections. The subjective section in this case lacks substance to support the findings, and there is no technical section, not even to verify the provided specifications. [Due to time constraints, the *Measurements* section that appears in the review was not included in the pre-print copy sent to NAD—Ed.]

We are aware that every time a product gets anything less than a rave review, manufacturers and distributors will complain. NAD has always welcomed criticism from *Stereophile* and rather than arguing about it, has accepted it in stride, knowing the integrity of the magazine. This review of the NAD 214 and 216THX does not uphold *Stereophile* tradition of fine reviews.

P.S. Our condolences over the untimely death of Peter Mitchell. His insights

and profound understanding will be missed here at NAD, as they will no doubt be at *SGHT*. Cas Oostvogel

Product Manager
NAD Electronics LTD

Onkyo TX-SV727

Editor:

Thank you for reviewing Onkyo's TX-SV727 A/V receiver. I must say, we tremendously enjoyed Mr. Phillips's description of his exhilarating theater-listening experience. We also appreciated his observation that the unit "is extremely well-thought-out... flexible, and hefty." We would, however, like to address a few somewhat misleading points.

The TX-SV727 is well-thought-out, and you can be assured that this includes every aspect of the unit, including construction quality and reliability. It is unfortunate that Phillips felt compelled to question our quality based on his singular experience with one unit. The reality is that oftentimes a single review sample shipped via UPS is more susceptible to shipping damage. Phillips acknowledged to us in a phone conversation that he had apparently experienced shipping problems with UPS several times in the past. It is unfortunate that he chose not to balance the perspective presented in the article with this important piece of information.

In fact, Onkyo products enjoy an excellent reputation for both high quality and high reliability. Don't take our word for it: consumers and dealers and press (including *Stereophile*) have attested to this fact for years.

As far as Phillips's comments on the effect of the DSP modes on music, we can only respond that one man's "chestier" sound is another's "full and rich." Every listener will have their own unique perception. Of course, such is the nature of this type of subjective review and comment. We trust that *SGHT* readers will audition the unit and draw their own conclusion.

We are puzzled that Phillips would devote so much of the review replaying, word for word, an interaction with Onkyo's customer-service department that would never be experienced by a consumer. As he said, "Most of my misadventures occurred because I was outside the normal dealer/consumer loop..." We agree. This fact is mentioned late in the review well after the negative tone was set in the reader's mind.

Onkyo takes great pride in its ability to help the customer both before and after the sale. Onkyo products are sold only through authorized dealers that are select-

ed for their level of expertise and service and are the customer's first line of communication when, in rare occurrences, problems arise. Our dealers are among the best in the industry. Onkyo also provides extensive pre- and post-sale support. We are one of just a few audio companies that offers full-time customer support by Internet, mail, E-mail, fax, and telephone, and we monitor all of the major on-line services for questions and feedback.

On another note, it is important for your readers to know that regardless of the status of Phillips's specific review sample, all units are shipped from Onkyo's factory *without* the tape monitor engaged. Review samples are sometimes sent to multiple reviewers and perhaps his sample was inadvertently left that way by a previous reviewer.

Finally, Phillips noted a signal loss through the video switcher on his sample. The TX-SV727 video switching section employs a 6 dB signal amplifier to match the output to the input. In random testing we have found that all units came to within one-half dB of the original input. For most setups this will yield a signal that is virtually indistinguishable from the source.

The TX-SV727 is one of Onkyo's most successful products ever produced in its 21 years in the United States. While Onkyo appreciates the attention of reviewers like Mr. Phillips, our real reviewers are the tens of thousands of satisfied TX-SV727 owners. Prospective buyers may want to consider their input as well.

Thanks again for your review and the opportunity to comment.

Michael L. Strange
Senior Marketing Manager
Onkyo USA

Theta Data III

Editor:

First of all, our thanks to Tom Norton for a warm review of the Data III. We appreciate the effort that goes into critical evaluations of equipment like this, especially having to integrate both sight and sound in one's considerations.

I readily admit that this absolutely was *not* a consideration when Theta brought out the first incarnation of the Data Universal Transport, years ago. We considered Theta to be entirely about high-quality music reproduction, period, and yes, the Data *could* play videodiscs, but we barely took any notice of that. What we went gaga over was that great big, beefy transport. All our tests showed it would be able to do a better job of spinning CDs than the wimpy transports otherwise available for that purpose.

We are still sure we are right about that. The mechanicals in the base unit are absolutely great, and that's why we still use it.

Mr. Norton says he suspects that the original Pioneer DAC "is still present on the Data III's circuit boards and has been either bypassed or disconnected." He wonders why we didn't leave it operational, for those who might like to use it. We do indeed disconnect that part from the circuit. Otherwise it pollutes the digital audio lines with enough RF to audibly degrade the sound. There isn't enough room around it to build shielding for it, as it is just one component on a rather tightly stuffed board. As he points out, in Theta's design priorities, sound comes first.

There is something deeply puzzling, though, about Norton's findings on video resolution. In the last incarnations of the Data, we *have* paid quite a bit of attention to maximizing video resolution. We have gotten results from our measurements of Data transports that hover at 465 to 485 lines, and never go below 450.

I understand this is an odd objection, considering Norton found the Data to have 400 lines of resolution, that being the currently accepted state of the art, but the Data as we know it is better than that. It is true that this particular unit has been in *Stereophile's* editorial processes for over a year, shipped from California to New Mexico to Colorado and back to New Mexico, as it went from reviewer to reviewer. We need to check the alignment on this machine.

At least the part about the sound is as positive as we could possibly hope. We're happy that he feels it is in a class with a CD-only transport that has been his reference, and sells for almost twice as much.

In answer to the question, "Is there any point in buying an expensive laserdisc player now, with DVD on the horizon?" Well, yes. Over 20,000 titles have been pressed on laserdisc, and there are about 10,000 currently in print. We really can't be sure how soon all the bugs will be out of DVD, but we expect it could take years to really get rolling.

We are especially concerned about designed-in problems, like the lossy data compression in both audio and video. The demonstrations at this past CES were not very good at all. There may also be inherent jitter problems due to the sheer density of optical information on a realistically imperfect substrate. Also, since DVD discs are just as small and light as CDs, DVD players will undoubtedly revert to dinky mechanical transports. We are concerned, because we know CDs ben-

efit from being played on the beefy laserdisc-type transport. The Data transport now available will probably be the best thing any of us will ever see to play CDs on!

Toward the end of his review, Norton brings up some topics that have been quite influential for Theta's present developmental direction. In expressing a preference for the sound of the Theta, he says, "It is not surprising that differences are more pronounced in a 2-channel audio system. While the best movie soundtracks can be surprisingly good, none of them are as pristine as the best audio-only recordings. Furthermore, the rest of the reference audio system has higher resolution than even my definitely high-end home-theater setup." Theta's design team has been involved in a project to do everything it can to bring audiophile sensibilities and sonic standards to the home-theater experience. This is what Casablanca is all about.

We look forward to Casablanca providing the digital-processing heart of a truly no-compromise home-theater system an audiophile can love. Ah, but that is another letter. Again, many thanks.

Neil Sinclair
President
Theta Digital

Audio Alchemy UltraDAC

Editor:

Thank you very much to *Stereophile Guide to Home Theater* and Robert Harley for the very positive review of our UltraDAC jitter filter and Digital-to-Analog Converter. Once again it appears that Audio Alchemy has established the price-to-performance leader in this category. This is evidenced by Harley's conclusion that, "The UltraDAC offers excellent performance at a modest price"—strong praise in a review where UltraDAC faced serious competitors that were one and a half to twice its price!

Readers will be interested to note that UltraDAC belongs to the new Audio Alchemy "Video Products Group." Affordable, high-performance video switchers, 2-D comb filters, and line doublers will soon be joining the group.

Again, thanks for the great review.

Peter Madnick
Vice President
Audio Alchemy

Theta Chroma 396

Editor:

Robert Harley raises an intriguing question in his comparison of the Chroma with other moderately priced D/A converters. I think I can shed some light here.

He notes "...a strange phenomenon

that I can't explain: the outboard converters make the surround channels more prominent, detailed, and enveloping. Switching back to the MDP-600 makes the sound-field collapse toward the front. The improvement in surround performance with the outboard converters is greater than the differences I've heard between mediocre and superb surround-channel performance in A/V receivers."

Surround sound depends on phase integrity. Phase information is *all* that Pro Logic has to work with. A high-performance D/A converter such as the Chroma should, in the course of doing the best possible job of rendering all the other important aspects of the musical signal intact, preserve phase information. Stereo imaging depends on phase correctness, of course, which is why we worked long and hard to deliver *perfect* phase information in all Theta processors.

Mainstream companies are not so scrupulous in delivering fidelity in areas that are not subject to measurements by the standard suite of audio "specifications." It seems outrageous, and absurd, that huge companies build components that process musical signals dependent on phase information without bothering to make sure they aren't smearing it all to hell, but it appears that is exactly what is happening.

We like to think that the converters we build are more than the sum of their parts; they are built by listening tests at least as much as they are to meet specifications, and this is a wonderful example of the validity of companies who treat engineering as an art.

Our thanks to Mr. Harley for his very kind words!

Neil Sinclair
President
Theta Digital

Alón Petite Trio/C1

Editor:

Our thanks to Wes Phillips and *Stereophile Guide to Home Theater* for the review of the Alón Petite Trio/C1 system.

The review brings up several points regarding the philosophy of home-theater sound that deserve some comment. Our goal with Alón is to produce the most musically accurate loudspeaker possible at a given price point. Our goal has remained consistent and also extends to our home-theater products. We do not produce a second line of home-theater-type products that provide more quantity and less quality, although this is common in our industry.

Our approach to home theater is to provide an extension of high-quality 2-channel sound. The Alón Trio/C1 system can provide rewarding results on both music

and dialogue. This is confirmed by Wes Phillips's comment, "Articulate, engaging, and immensely enjoyable." Also, capturing the emotional content of music and speech is both difficult and rare in loudspeakers. The Trio/C1 system does this as well. To quote Wes, "Musical scores exhibit a clarity and majesty that is like being exposed to raw emotion—which is, after all, what the composers are after."

In home-theater applications, the Alón Trio/C1 system represents our priorities in reproducing sound. Understanding the words during loud and cacophonous sound effects is both important and rare in the world of home-theater loudspeakers. Also, the system must be able to transport the listener to the environment depicted in the film. Once again, the Trio/C1 system delivers. To quote Wes, "Dialogue, action on the screen, ambient cues, and music are all presented with beguiling clarity. Watching *First Knight*, I felt as though 12th-century England surrounded me."

Regarding the low-frequency response of home-theater systems, we would offer the following: When price is a factor, one must choose whether to emphasize quality or quantity. The PW1 provides excellent definition and speed to properly match the quick Alón Petites. In addition, the PW1 provides a more natural stereo bass with ambience-retrieval capability simply not available at this price point. This we feel is necessary in order to obtain the most natural sound possible.

The output capability of low-frequency reproducers cannot be intelligently discussed without knowledge of the room. Room size specifically is important in determining the maximum-output SPL capability. The PW1 is designed for small to medium rooms for music, and for small rooms for home theater.

Regarding placement of the PW1, we have found that this is room-dependent. It is generally not placed to the inside of the left speaker, as Wes did. We suspect that when the PW1 was placed in the corner, it activated room modes that colored the reproduction.

We agree with Wes in that we would also prefer unlimited amounts of high-quality stereo bass from a \$500 woofer. However, as he points out, large, high-quality subwoofers tend to be very expensive.

Regarding the essential characteristics a home-theater system must possess to be satisfying, Wes states: "The Alóns do this as well as anything I've heard in my room."

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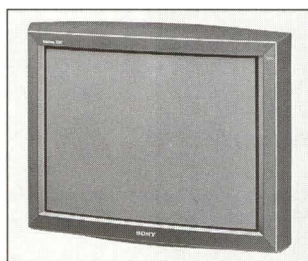
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Hot Laserdiscs

Reviewed by: Lawrence B. Johnson,
L. J. Linton, Nancy Malitz, Wes Phillips,
Brian Rabey, Gary Reber, Steven Stone

Braveheart

Starring Mel Gibson, Sophie Marceau, Patrick McGouhan. Directed by Mel Gibson. Widescreen. Three sides. 177 minutes. 1995. Dolby Digital AC-3 and Dolby Surround. Paramount LV33118-2WS. CLV R. \$50.

In its widescreen laserdisc release, this year's Academy Award winner as Best Picture looks the part. *Braveheart* is visually sumptuous. The naturalistic detail achieved in Mel Gibson's concept emerges from the video release with a compelling aura of truth. The ruggedness and beauty of the land, the tribulations and spirit of the Scots blend into a life force undimmed by the distance of centuries. Those brave hearts beat full and everlasting on Gibson's splendid canvas.

On sun-drenched plains, in misty valleys, in rainstorms and moonlit woods, the historical panorama of *Braveheart* unfolds in breathtaking beauty. Some critics complained that the night scenes—for instance, William Wallace's

(Mel Gibson) dream-state meeting with his murdered wife—were indecipherable. But on laserdisc, the dark brilliance of that very scene becomes one of the most striking images of the entire film.

The sprawling battles are shattering in their intensity. Rarely has blood flowed so copiously on film. Legs are severed, skulls pierced, heads lopped, bowels ripped—all with a specificity that's in no way mitigated by the laserdisc or the smaller home screen. That said, *Braveheart* should be seen on a fairly grand monitor, and heard through a great sound system. The clashing of swords, the thunder of hooves, and the

crushing of bodies are painted in sound no less powerfully and terribly than in the pictures themselves. Not least, James Horner's musical score, by turns earthy and atmospheric, sharpens the sensory point of a film (and a laserdisc) not to be missed.

—LBJ



A Boy and His Dog

Starring Don Johnson, Susanne Benton, and Jason Robards, with Tim McIntire as the voice of "Blood." Directed by L.Q. Jones. Widescreen. Two sides. 90 minutes. 1975. Lumivision LVD 9529. CLV. R. \$50.

Set in 2024, after World War IV ("It lasted only five days"), *A Boy and His Dog* follows the adventures of Vic (a young Don Johnson) and his pooch, Blood, as they hunt through the craters and ruins of mud-covered cities in search of enough food to stay alive. They face the constant threat of roving gangs, competing "solos," and "screamers," glowing radioactive creatures that can kill you with just one touch. Blood proves to be the most human character in the film, watching over his master and guiding him through danger.

An earlier release on VHS tape began letterboxed, but reverted to pan-and-scan after the titles. One could easily see how much of the artfully calculated images was lost. Now we have it all, carefully transferred from the original negative and magnetic-sound elements. Although wear marks show up at reel changes and the mono soundtrack betrays its bargain-basement origins in sparse sound effects and a general lack of bass, the film's stunning photography comes through.

What's more, an entertaining and enlightening commentary is provided on one of the analog channels by writer-director L.Q. Jones, cinematographer John Morrill, and film critic Charles Champlin. Happily, the three contributors favor anecdotes and production background over technical process. —LJL

The Alamo

Starring John Wayne, Richard Widmark, Laurence Harvey, Richard Boone, Frankie Avalon, Chill Wills. Directed by John Wayne. Widescreen. Five sides. 202 minutes. 1960. MGM/UA ML 102581. CLV. NR. \$70.

John Wayne tried to make this film for 14 years; in the end, he broke his contract with Republic Pictures, put up the cash, and directed *The Alamo* himself. But its original 202-minute running time was soon trimmed by 18 scenes, some crucial to the film's continuity. This restored laserdisc version reveals *The Alamo* to be a far better film than most critics ever suspected.

The plot is instantly familiar: On March 6, 1836, after a 13-day siege, 185 Americans made their final defense of an abandoned mission against the onslaught of a Mexican force numbering between 2400 and 5000. The defenders were annihilated.

John Wayne tells the epic story with gusto and surprising grace. He plays Davy Crockett. And as director, he proved to be generous with the actors around him, giving everyone a chance to look good—even General Santa Anna and the Mexican forces.

The video transfer is stunning, the parched Texas landscape so brilliant that

I felt the need for sunglasses. The wealth of detail cries out for a really big screen. In one eloquent scene, a party of Alamo defenders penetrates Mexican lines. Wading, and crouched in the darkened river, they are oblivious to a woman—lit by firelight—dancing to amuse the sentries. Moonlight and firelight glint off wavelets while the

dancer and her admirers glow in the distance. It's a moment of purity and poetry amidst the deadly struggle.

The sound is quite good considering the film's age, and Dmitri Tiomkin's suitably folksy, heroic score is well served. The set includes a "making of" documentary that unfortunately adds the cost of a third disc. —WP

The Wild Bunch

Starring William Holden, Ernest Borgnine, Robert Ryan, Warren Oates, Jaime Sanchez, Ben Johnson. Directed by Sam Peckinpah. Widescreen. Three sides. 145 minutes. 1969. Warner 14034. CLV. R. \$40.

It is said of Beethoven's symphonies that their conclusions are implicit in their opening chords, and this is also true of *The Wild Bunch*. A group of soldiers rides into town, outlaws determined to rob the railroad. As the camera pulls

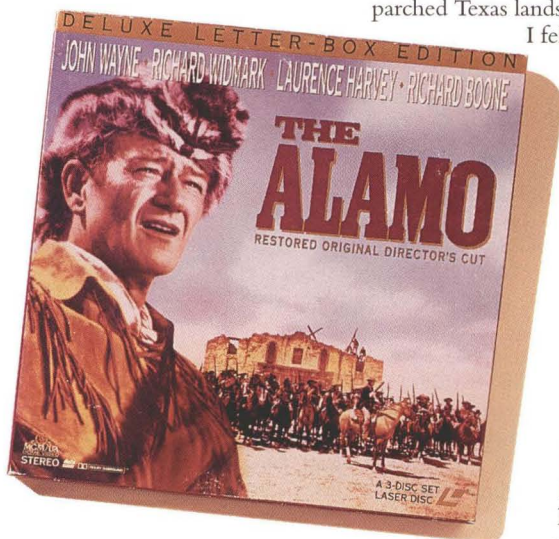
away, it reveals armed men on the surrounding rooftops: The brigands' getaway path is transformed into a killing field. Although the bandits escape the ambush, they cannot outrun their fate. The rest of the film is a chase—the posse pursues the outlaws as the outlaws pursue their destiny.

What a cast Sam Peckinpah had to work with! Their smallest turns deliver more emotional impact than the climaxes of most contemporary movies.

These characters are compelling and believable, even when larger than life. It must be said, however, that *The Wild Bunch* is a violent and disturbing film, and one suspects Peckinpah relished the gore for its own sake.

The director's cut restores vital scenes unseen since the theatrical opening in July 1969. The additions fill a couple of gaping holes in the plot. The laserdisc transfer offers vivid color and amazing detail. Interior scenes are especially revelatory. Shot as though by available light, they are filled with earth tones, and even the deepest shadows hide nothing.

The remixed stereo soundtrack is all too clear: Listeners with high-end



sound systems may hear the occasional lapse in Foley continuity. In several scenes, the dialogue does not match the general sonic ambience. But that's a minor point in the big picture of this brilliant remastering. —WP

The Mystery of Rampo

Starring Naoto Takenaka, Michiko Hada, Mashiho Motoki. Directed by Kazuyoshi Okuyama. Japanese with English subtitles. Widescreen. Two sides. 101 minutes. 1995. Evergreen-Image ID 3042 HL. CLV. NR. \$40.

This elegant Japanese film revolves around a mystery writer whose latest, banned novel comes to life. The day after his meeting with the government censor, he finds a story in the newspaper that exactly mimics his own plot line. When curiosity drives him to meet the real-life woman suspected of murdering her husband, reality and fantasy proceed to merge into a feverish dream that leaves the viewer hard-pressed to tell fact from fantasy. Even multiple viewings afford little clarification.

But plot clarity is the least important element of this extraordinary film, which stands among the most visually beautiful I've ever seen. Every frame is exquisitely constructed. Linear form, color, and frame movement are choreographed in ideal proportion. You will often find your fingers itching to hit the still-frame button on the remote-control so you can linger over individual shots; many would make superb still photographs. Even scenes of physical violence possess a visual perfection that abstracts them from reality.

The film's music and sound effects are no less striking. The musical score, composed by Akimasa Kawashima and performed by the Czech Philharmonic Orchestra, is at once mysterious and

evocative. Special effects, notably storms, are rendered in suitable surround-sound splendor. One particular lightning strike was enough to send my cats scurrying for cover. —SS

Beyond Rangoon

Starring Patricia Arquette, Francis McDormand, Spaulding Gray. Directed by John Boorman. Widescreen. Two sides. 99 minutes. 1995. Columbia-TriStar 49326. R. \$35.

A young woman, suffering from extreme personal trauma, is whisked away to Burma by her sister for a healing vacation. Through suffering, the woman finds rebirth. While it certainly isn't a new concept, director John Boorman wraps this tale of personal salvation in the political upheaval of modern Burma. Despite heavy borrowings from *The Year of Living Dangerously* and *The Killing Fields*, *Beyond Rangoon* succeeds on its own terms. Patricia Arquette's character is a compelling Western every-woman whose strength we might all hope to find within ourselves if faced with a similar situation.

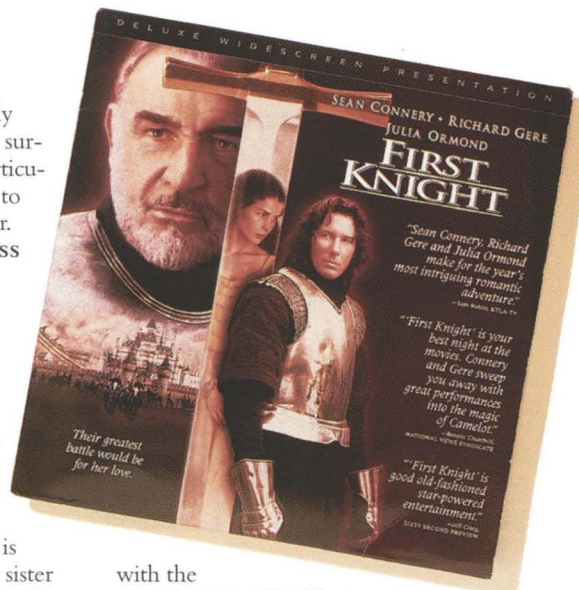
Boorman is an old pro at making technically superb films, and he delivers the rich palette of Southeast Asia with cinematic panache. How many variations on the color green are there on earth? You'll certainly run out of fingers counting them in *Beyond Rangoon*. This transfer retains the full range of color and shadow detail, even in scenes shot in dark and contrasty rain forests.

Since the film contains ample military action, your surround system will get a workout. Explosions, bullets whipping by your ears, and other egregious sound effects dot the landscape. Yet those are balanced by the more subdued sounds of an evening breeze on the river, crickets chirping at night, and assorted jungle noises. A smorgasbord, in short, for every auditory sensibility. —SS

First Knight

Starring Sean Connery, Richard Gere, Julia Ormond, Ben Cross. Directed by Jerry Zucker. Widescreen. Three sides. 133 minutes. 1995. Columbia TriStar 71176. CLV, Sides 1 and 2; CAV, Side 3. PG-13. \$45.

First Knight is the sort of sweeping epic Hollywood has seldom produced these last 30 years, and it boasts a sweetly romantic nature quite out of keeping



with the cynical 1990s. This film's Camelot is a place filled with pomp and mind-numbing ceremony—although it is all sumptuously photographed. Not that it doesn't have a lot to overcome, notably a performance by Sean Connery that verges on sleepwalking and Ben Cross' portrayal of Malagant as a man so fanatically pop-eyed about the law and his own power that he must have been toilet-trained at sword point. At times, the script creaks along ponderously.

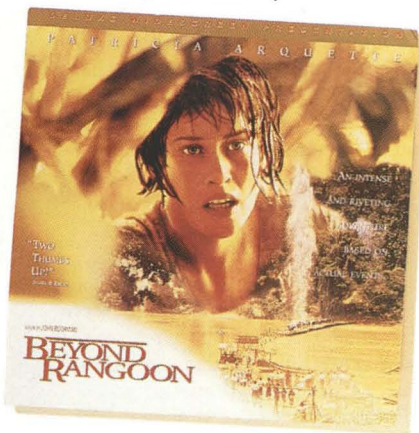
But surrender to the film's charms and there's much to recommend it, starting with sympathetic performances by Richard Gere and Julia Ormond. The ravishing cinematography sweeps from a mounted, night-time charge that could have been painted by El Greco—black-velvet backdrop, moonlight glinting off armor in mercurial silver highlights—to interior scenes filled with the translucent daylight of a Vermeer.

The evocative soundtrack helps to draw you into this ancient world, whether through a storm that drives Lancelot and Guinevere to shelter, or in the fabled knight's final battle with the evil Malagant, swords clanking and flashing onscreen while the tumult of their comrades swirls around you. So go ahead, surrender. —WP

Kids

Starring Leo Fitzpatrick, Justin Pierce, Chloe Sevigny. Directed by Larry Clark. Widescreen. Two sides. 102 minutes. 1995. Vidmark LDV 6311. NC-17. \$35.

Move over Godzilla, Jason, and the Blob. Larry Clark has created a far more terrifying onscreen monster—only this one comes from real life. Clark's horrific creature is an HIV-positive, smooth-talking punk who lives to deflower virgins, the





younger the better. The plot of *Kids* is rather simple: Can one of this diseased Don Juan's victims, who has just discovered that she also is HIV-positive, stop him before he scores again?

Although the film feels like a documentary, it's actually a carefully scripted modern morality tale, similar to Hieronymus Bosch's medieval depictions of the deadly sins. How ironic that this incredibly effective anti-promiscuity, anti-drug flick is rated NC-17. Every important character in the film is well under that age.

Kids is at once a gripping portrait of modern, street-wise teenagers in the big city and a beautifully produced film. The phrase "suspension of disbelief" certainly applies to this movie. Every shot feels real, even though after careful analysis it is plain that each frame is too technically perfect to be cinema verité. Pallid skin tones, Colt-45 malt golds, backlit blue-gray pot smoke, and urban grime are

all accurately rendered on the laserdisc transfer. The soundtrack pulses with the urban noise of subways, buses, rap music, crude language, and the guttural animal sounds of adolescent humans in something like a state of nature. —SS

Virtuosity

Starring Denzel Washington, Kelly Lynch, Russell Crowe. Directed by Brent Leonard. Widescreen. Dolby Digital AC-3 and Dolby Surround. Two sides. 105 minutes. 1995. Paramount LV33144WS. R. \$40.

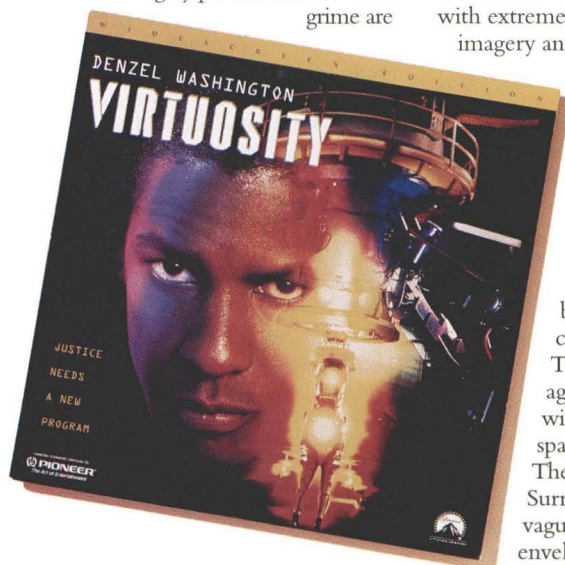
Virtuosity is a thrilling cyberspace ride into the world of virtual reality.

Denzel Washington stars as Parker Barnes, an ex-Los Angeles cop out to stop Sid 6.7, a computer-generated "virtual" criminal synthesized from the worst traits of 200 notorious killers. Sid (for "sadistic, intelligent, dangerous"), played by Russell Crowe, was designed to help police officers understand the criminal mind by acting in crime scenarios that test the department's skills. But the virtual criminal manages to assume a corporeal form and escape the bounds of cyberspace. Sid's a malevolent machine, virtually unstoppable in the real world because his silicon-based body parts can be quickly regenerated. Parker's job is to track him down and stop him.

Spectacular special effects and fast-paced action make *Virtuosity* a jolt of a thrilling experience. The Super 35 picture has been altered from its original 2.35:1 aspect ratio and reformatted at about 2.13:1. Picture quality is stunning, with extremely sharp and detailed imagery and excellent shadow detail.

Colors are vivid, blacks exceptionally deep and solid, the flesh tones natural. There is no apparent noise and just an occasional artifact. It all adds up to a reference-quality presentation.

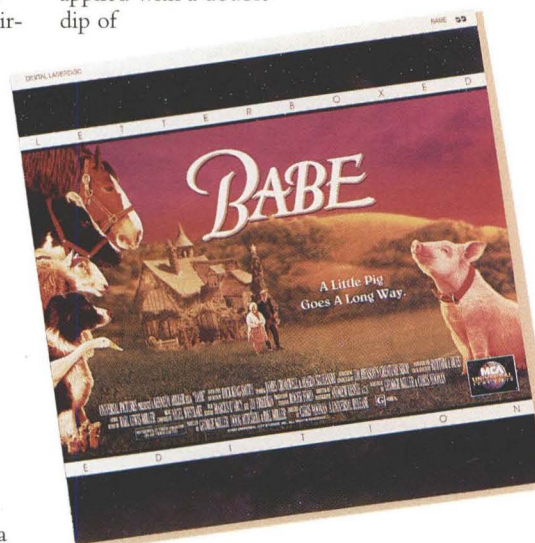
This is also one of the better 5.1-channel, discrete-digital sound mixes. The surround sound is aggressively enveloping, with distinctively localized spatial and directional cues. The matrixed Dolby Surround is comparatively vague, although the sense of envelopment is quite good. —GR



Babe

Starring James Cromwell and Magda Szubanski. Animatronic characters from Jim Henson's Creature Shop. Directed by Chris Noonan. Widescreen. Two sides. 92 minutes. 1995. MCA/Universal 42692. CLV. G. \$35.

Here is a story that seems to leap straight from wishful childhood memory, where every vista is as perfect as a hand-colored postcard. You wouldn't think the story of a pig that thinks it's a dog would place heavy demands on a television, but these pastoral images roll out with quiet intensity and a thousand shades of green and gold, as if applied with a double dip of



Nature's paintbrush; your TV's color had better be finely tuned. Real animals and their puppet look-alikes abound in this film, and you'll be hard-pressed to tell them apart. [The film won an Oscar for Best Visual Effects—Ed.]

The star is Babe, a short-haired white pig, who comes to the Hoggett farm orphaned and seeking a purpose. Mrs. Hoggett envisions Babe on a dinner platter, but Mr. Hoggett, who has contemplated Babe's expressive snout and gazed into those kindly eyes, sees more. The heroic transformation of this little animal causes no small ruckus in the barnyard, where dogs, ducks, horses, and mice have roles entrenched in a tradition that Babe topples.

Still, such a humble tale might seem overmatched by the mighty roar of the score's central musical motive: Saint-Saëns "Organ" Symphony—not to mention a trio of mice singing opera. In fact, it all makes perfect sense once

you surrender to Babe's fervent spiritual struggle. So just kick back and turn up the subwoofer on this sonically splendid soundtrack. —NM

Showgirls

Starring Elizabeth Berkley, Kyle MacLachlan, Gina Gershon. Directed by Paul Verhoeven. Widescreen. Dolby Digital AC-3 and Dolby Surround. Three sides. 131 minutes. 1995. Sides 1 and 2, CLV; Side 3, CAV. MGM/UA ML 105525. NC-17. \$50.

Showgirls, the controversial NC-17 Las Vegas flesh opus, spotlights Elizabeth Berkley as Nomi Malone, a tough girl without a family, trying to cover up her past as a hooker and make it as a dancer on the glamorous casino scene. When she is befriended by a seamstress for the hottest show in town, *Goddess*, Nomi begins her rise from lap dancer in a seedy strip club to high-class stardom.

In this NC-17 director's cut, filled with sizzling dance sequences and erotic encounters, the visuals have the slickness of a glittering Las Vegas production. The THX-certified transfer and pressing offer exemplary picture quality, though the composition has been altered from its original aspect ratio of 2.35:1 to 2.10:1. Color fidelity is excellent, with solid blacks and flesh tone that's, well, *au naturel*. Images are sharp and detailed, with resolution that reveals textural subtleties. Contrast is superb, and the picture is unmarred by noise or artifacts.

The Dolby Digital AC-3 soundtrack out-glitters the Dolby Surround matrix version, creating a vivid feeling of presence for the high-spirited dance numbers. The sonic drama is particularly stirring in the climactic volcano number, in which you become part of the audience seated in the middle of explosive sound effects. Directional sounds are sharply localized in the discrete version, which also offers somewhat better surround envelopment. But both the digital and matrix recordings are quite satisfying. —GR

Cocoon

Starring Don Ameche, Wilford Brimley, Hume Cronyn, Brian Dennehy, Jack Gilford, Steve Guttenberg, Maureen Stapleton, Jessica Tandy, Gwen Verdon. Directed by Ron Howard. Widescreen. Two sides. 117 minutes. 1985. 20th Century Fox 0147685. CLV. PG-13. \$40.

There is nothing better than a movie with great special effects when special

effects are not the point. One can only marvel at how Industrial Light & Magic created those ephemeral aliens, whose wispy bodies look like light in human form; yet even when you know they are super-thin dancers in skin-tight bodysuits with finger extensions and glowing contact lenses, you still give little thought to the technical achievement because the story is just too good.

It's about a trio of old men, heading crankily toward life's final sunset, who decide to take an illegal dip in a neighbor's pool. Alien rocks at the bottom turn out to be cocoons emitting youth juice, and the geezers' lusty old energies return, to the astonishment of their friends and wives. Eventually the humans learn more about their extraterrestrial neighbors and their purpose on earth, but not before the mission is seriously derailed.

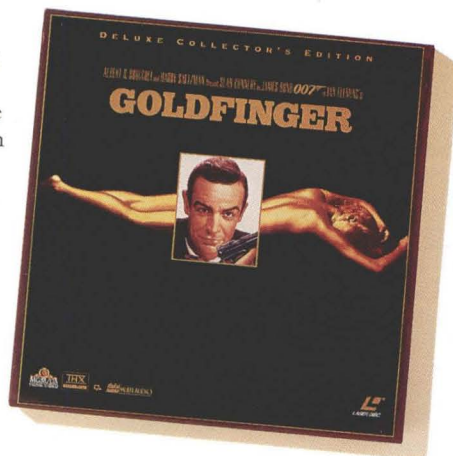
James Horner, the master of otherworldly soundtracks, and ILM, his counterpart for visual special effects, are well served here by director Ron Howard. The film painstakingly zooms in on the clinical ugliness of institutional living spaces for seniors, where pale linoleum floors and cookie-cutter rooms seem to bleach the very spirit from the residents. The life force that rushes in, compliments of the aliens, is a dizzying feast of sound and color. The detail on the laserdisc makes you a believer. Once you see the flush of energy coursing under the translucent, wrinkled skin of Jessica Tandy, whose ice-blue eyes prove quite capable of fire, you want nothing more than for the story to be real. —NM

Goldfinger

Starring Sean Connery, Gert Frobe, Honor Blackman, Harold Sakata. Directed by Guy Hamilton. Widescreen. Six sides. 115 minutes. 1964. MGM/UA ML105198. CAV (Side 5, CLV). PG. \$100.

The James Bond craze reached its zenith with the release of *Goldfinger* in 1964. Lines of curious moviegoers circled entire city blocks just to see Sean Connery score with the women and outfox the bad guys. No actor had brought this much glitter and glamour to movie screens since Cary Grant. This was Ian Fleming's James Bond at his best.

This new deluxe-edition boxed set is a Bond fan's dream come true. Everything one could possibly want to know about *Goldfinger* is right here:



seven hours of interviews, glimpses behind the scenes, details on everything from the Aston-Martin DB5 to Harold Sakata's (Oddjob) TV commercial for Vicks Cough Syrup. Did you know Gert Frobe (Auric Goldfinger) spoke German throughout the filming, and was later covered in English by actor Michael Powell?

MGM/UA's previous letterboxed pressing of *Goldfinger* offered a presentable-looking transfer and included a stereo main title for the first time. This new edition heightens color accuracy, shadow detail, and overall sharpness to create the best-looking *Goldfinger* yet.

My only complaint concerns the digital soundtrack, which varies in quality from brittle to downright shrill. The main title, sung by Shirley Bassey, can send you screaming for the tone control on a wide-range system—hardly typical of THX-certified mastering.

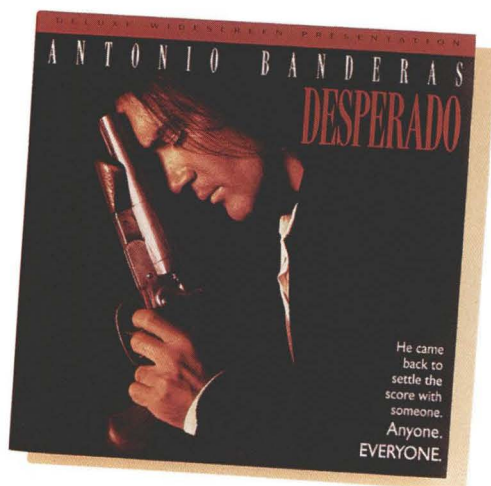
But all told, if this is an example of things to come, I can't wait for *Dr. No*, *From Russia With Love*, and *Thunderball*.

—LJL

Bull Durham

Starring Kevin Costner, Susan Sarandon, Tim Robbins. Directed by Ron Shelton. Widescreen. Two sides. 108 minutes. 1988. Orion ID3217OR. CLV. R. \$40.

Sometimes you win, sometimes you lose. And sometimes it rains. That's baseball. And that pretty well sums up the simple—if not exactly innocent—charm of *Bull Durham*, which now makes an overdue debut on widescreen laserdisc. The new edition looks better than the earlier pan-and-scan disc, with deeper hues built from deeper blacks. But the heightened level of satisfaction really stems from the sheer width of the image. These may not be the sandy vistas of *Lawrence of Arabia*, just the little



ballparks of the Class A Carolina League; but when you can take in the diamond from first to third and feel the embrace of the crowds down the foul lines, you merge into the picture in a way that just doesn't happen with pan-and-scan.

The colors here are first-rate: true, rich, and inflected. It's scarcely enough to call the flesh tones natural. They are painterly, and especially expressive in closeups—Kevin Costner marching to the plate, muttering defiance at the opposing pitcher, the young Tim Robbins squinting quizzically at his veteran catcher and petulantly shaking off signs, Susan Sarandon teaching the boys how to bat (in more ways than one).

Bull Durham is no sonic thriller, though the understated surround quality is quite atmospheric, much like that of *Field of Dreams*. Does it feel like the old ballpark? You bet. Right down to John Fogerty belting out "Centerfield." —LBJ

Desperado

Starring Antonio Banderas, Joaquim De Almeida, Salma Hayek. Directed by Robert Rodriguez. Widescreen. Two sides. 103 minutes. 1995. Columbia TriStar 11656. CLV. R. \$40.

Director-writer Robert Rodriguez stormed Hollywood on the coattails of his \$7000 16-mm production *El Mariachi*. No one believed he could create such a finished film for so little money. To prove it, he reworked his story with a bigger star and higher production values. But he went back to the same small Mexican town and, as he had done in the original film, he used wheelchairs instead of dollies. The new movie was called *Desperado*.

Antonio Banderas stars as the Mariachi, a revenge-driven musician who packs more than a guitar in his instrument case. His rat-tat-tat tune decimates two bars full of bad guys. The film slowly reveals his past as he works his way toward a final confrontation with the deadly drug dealer, Bucho (Joaquin De Almeida).

Clearly aimed at movie buffs, *Desperado* is filled with inside jokes and cinematic allusions. The infrequent moviegoer may well feel lost amid the violent proceedings. *Desperado* was intended to be little more than a cinematic roller coaster, and the story moves crisply from one violent setpiece to another.

The laserdisc transfer is gorgeous, with picture quality that's sharp throughout; blacks are deep, highlights detailed. The photography's southern light will test the contrast range of any television. Likewise, the aggressive surround sound is worthy of the finest Dolby decoders.

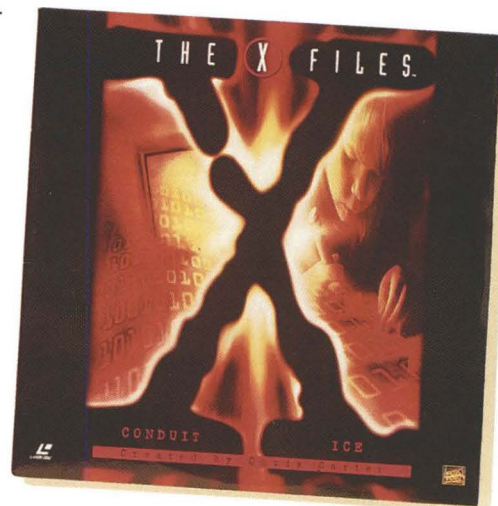
—LJL

A Man for All Seasons

Starring Paul Scofield, Wendy Hiller, Robert Shaw, Orson Welles, Susannah York. Directed by Fred Zinneman. Widescreen. Three sides. 120 minutes. 1966. Columbia TriStar 80986. CLV. G. \$40

Thirty years ago, *A Man for All Seasons* dominated the Academy Awards, winning seven Oscars out of nine nominations. Finally, after three decades, the film has been restored to its original 1.85:1 cinema aspect-ratio in a home-video release. The historical tale unfolds around King Henry VIII's determination to secure a divorce from his first wife

and to win the blessing of Sir Thomas Moore, a highly respected member of the King's High Council. But Moore, a devout Catholic, will not coun-



tenance Henry's violation of Church law—and his idealism costs him his life.

Prepared by Sony Pictures and the UCLA Film and Television Archive from a 35-mm master negative, the new laserdisc looks sharp and clear. Over the years, I've viewed this film on VHS tape, television, and laserdisc, and the present release is the first to get the beautiful palette right. The Thames's muddy shore, a garden of lilacs, the subtle inflections of flesh tones—all possess a palpable realism. The transfer also scales down overall picture brightness so that details emerge as never before.

George Delerue's score, mirroring the style of English Renaissance music, lends majesty to the film. Although not Dolby encoded, the sound on this new disc comes through with all the power and vitality of the original soundtrack album.

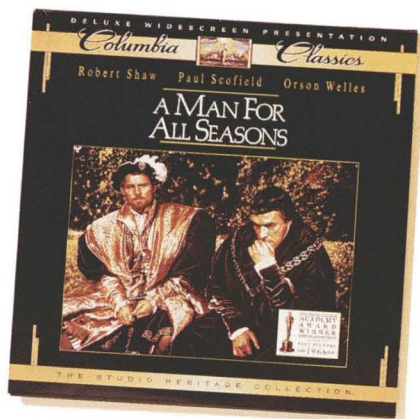
—BR

The X-Files: Conduit/Ice

Starring David Duchovny, Gillian Anderson. Directed by Daniel Sackheim (Conduit), David Nutter (Ice). Two sides. 90 minutes. 1994. Fox Video 0893885. CLV. NR. \$30.

The wild success of *The X-Files* proves that quality pays off. All the key ingredients, from writing and production to acting and directing, reflect a very high standard. The present disc is one of three released from the program's first series; each contains two uncut episodes, with opening remarks from the executive producer and creator, Chris Carter.

"Conduit" concerns the abduction by



aliens of a young woman camping at a lake with her younger brother and mother. While investigating the woman's disappearance, Special Agents Mulder and Scully discover a parallel to the abduction of Mulder's younger sister 21 years before—and that the victim's brother is a conduit through which information is transmitted from the aliens via television.

"Ice" finds Mulder and Scully investigating the effects of parasitic worms on the inhabitants of a research station near the North Pole. Carter admits the episode was inspired by *The Thing*.

The disc's visual aspects are excellent. The transfer delivers accurate colors in general, with natural flesh tones, and the overall image is quite crisp. Disappointingly, Fox has not included the surround-sound present in each telecast. Still, the sound is well-defined and preserves the fine sense of mood that plays such a large part in the magic of *The X-Files*. —BR

imagery combine with a dramatically charged score to produce a riveting cinematic experience. This THX-certified disc is nothing short of a glorious sensory experience. The aspect-ratio is true to the original 2.35:1 Panavision frame. The sharp, detailed picture reveals virtually no noise or artifacts; shadow detail is exemplary. To these virtues may be added accurate flesh tones, deep blacks, and excellent picture contrast.

While both the Dolby Digital AC-3 and Dolby Surround soundtracks make aggressive use of ambient information, there is hardly any audible difference between the two versions. And that's really to say the discrete format doesn't make very effective use of sound localization. Nonetheless, *Species* is a sonically involving thriller. —GR

The Madness of King George

Starring Nigel Hawthorne, Helen Mirren, Ian Holm. Directed by Nicholas Hytner. Widescreen. Two sides. 110 minutes. Dolby Digital AC-3 and Dolby Surround. 1994. Hallmark ID3182HL. CLV. PG-13. \$40.

It was during the reign of King George III that England lost its colonies in America. And in the aftermath of the Revolution, the indignant king suffered a period of acute paranoia and schizophrenia that rendered him unable to function and nearly cost him his throne. That's the historical gist of *The Madness of King George*, a literate and elegantly constructed movie—part history play, part black comedy—that has been transferred to laserdisc with its considerable production values solidly intact.

As a costume drama that moves between royal drawing rooms and the English countryside, *King George* unfolds in a rich cinematic tapestry: from architectural giltwork and red-velvet cloaks to misty dawns and verdant meadows, the disc plays out a blaze of color. Much of the film is shot at night or in shadows, metaphors of the confusion that settles upon the king's troubled mind; and those half-lit scenes reveal just the intimation of detail that evokes George's middle ground between truth and fantasy.

Sonically, the film exemplifies what surround sound—particularly discrete digital surround—can achieve in terms of sheer subtlety. No whizzing bullets or car crashes, but plenty of the natural resonances that tell us we're in a busy palace or in a session or Parliament or drinking deeply of the wide, restorative

outdoors. Composer George Fenton's adaptation of 18th century music, especially Handel, adds more zesty flavor to the sonic mix. —LBJ

Nicholas and Alexandra

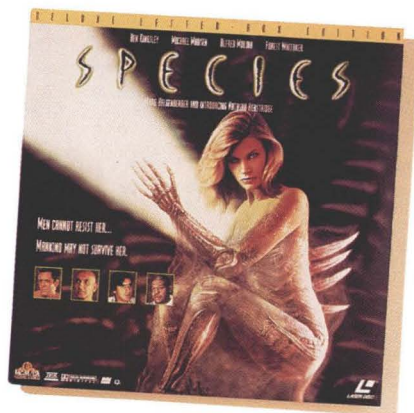
Starring Michael Jayston, Janet Suzman, Tom Baker, Laurence Olivier. Directed by Franklin Schaffner. Widescreen. Three sides. 172 minutes. 1971. Columbia TriStar 81306. PG. \$50.

Nicholas was the last of the Romanov czars of Russia. With his wife, Alexandra, and their five children, he was shot to death by the Bolsheviks during the revolution of October 1917. *Nicholas and Alexandra* is the epic—indeed, epochal—story of the Romanovs' fall, and it is a saga for the widescreen if ever there was one. Not just widescreen, but *big* screen. Presented in its original 2.35:1 aspect ratio, the conceptual and historical hugeness of this film cries out for home-viewing on a 60-inch monitor, or better yet on a front-projection screen of seven, eight or 10 feet. Its scope is simply tremendous.

Nicholas and Alexandra won the 1971 Academy Awards for costumes and set design. Both the diamond-clustered excess of court life and the colorless poverty of the masses register a burning truth. But the film also might have captured the Oscars for actor and actress. Michael Jayston and Janet Suzman were unknown to the screen but stars of the Royal Shakespeare Company, and their performances here—as complex personalities and as a married couple—are utterly convincing.

Sonically, the disc is quite adequate, if not the surround-sound spectacle one expects these days. Richard Rodney Bennett's lavish score, however, comes across with its royal colors flying. —LBJ

SGHT

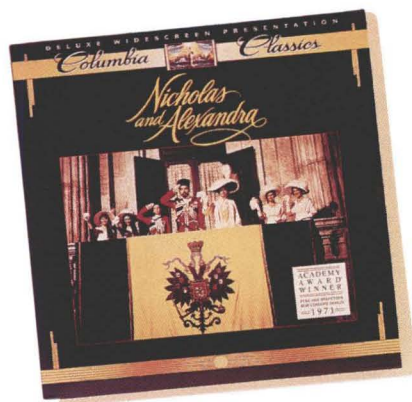


Species

Starring Ben Kingsley, Michael Madsen, Alfred Molina, Natasha Henstridge. Directed by Roger Donaldson. Widescreen. Two sides. 108 minutes. Dolby Digital AC-3 and Dolby Surround. 1995. MGM/UA ML105525. CLV. R. \$35.

Species is an adrenalin-charged science-fiction tale about an alien conceived on earth via the transmission of genetic data from another world. When the alien escapes from a research lab and takes the form of a beautiful, intelligent young woman (Natasha Henstridge), she is hunted down by a team of specialists determined to prevent her from creating a race of predators that might destroy humankind.

Spectacular special effects and



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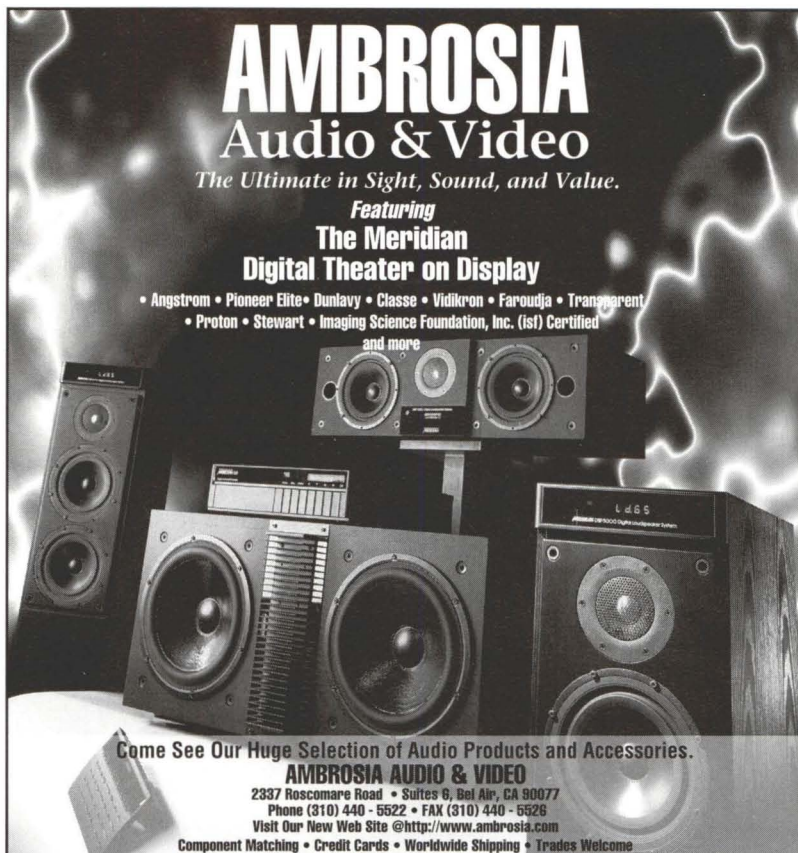
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THE FINAL WORD

EARLY ADOPTERS

Larry Archibald

Every time a new technology comes along, the press is filled with stories about “early adopters.” These enthusiastic souls rush right out and buy the latest and greatest gadgets, even though they know that first-generation products tend to be expensive, bug-filled, and risky. Perhaps you recognize the type? Were you the first person in your town to own a CD player? Did you buy a DSS system within the first month they went on sale? Were you among the first to install Windows 95 on your hard drive? If so, you’re a great candidate for DVD.

Early adopters (sounds like velociraptors) are the people who give new technologies their first chance. They plunk down hard-earned dollars to try out *right now* what others will take years to buy, but they are also the ones left holding the bag when a new technology goes down. And new technologies *do* go down: Remember Elcaset, 8-track, the RCA stylus-read videodisc, Beta, DAT (as a consumer format, anyway), DCC, and MiniDisc?

There’s no doubt that the safest course is to wait and let other people take the plunge. CD took three years to really get rolling, in spite of the tremendous marketing muscle applied; analog cassette, for Pete’s sake, took 10 years (it started out as a dictation medium in the ’60s). And, contrary to my predictions and wishes, MD is seeing startling growth in Japan right now, though it still goes nowhere here in the States.

Abandoning safety, though, I’m going to make a prediction and a recommendation: DVD will be a huge hit, and you might as well buy into it early. What’s more, Pioneer has announced some products that take out almost all the risk, though they’re virtually certain to squash the sales of the Pioneer and other LD players we’ve reviewed in this issue.

Pioneer is coming out in the fall with two *combo* LD/DVD players. One is a \$1799 “Elite” series model; the other is a standard-line unit priced at \$999. No, at these prices they won’t be the players that compel the movie companies to flood the market with DVD remastered films, but they’re perfect for someone who reads *Stereophile Guide to Home Theater*. You can be sure Pioneer’s best laserdisc technology will be inside, and you can find out what all the DVD fuss is about—risk-free, almost.

Nothing about a new technology is risk-free, of course. But given the big companies, big money, computer connection (DVD-ROM opens whole new realms in multimedia), convenience, and quality increase—over VHS, natch, since that’s where the big bucks currently are—DVD is just about guaranteed to be a market success. Give it a shot. If DVD fails, you can give me a shot!

Finally, we’ve been making some changes here in Santa Fe. On May 6th, Ralph Johnson joined Stereophile, Inc. as President. That’s been my title, along with Publisher and CEO, since we

started out in 1982. However, the strains and pressures of putting out not just one but six periodicals, *and* producing a helluva big high-end hi-fi show once a year just got to be more than I could handle. I *will* continue in my sextuple role of Publisher, and I get a boot upstairs from CEO to Chairman of the Board, but from now on Ralph will be running the company.

Ralph’s a great guy—if you stop in at our offices in Santa Fe you’ll get to meet him and see. He worked for Stereophile once before, from 1991 through 1993, running our hi-fi show. He took that venture from a catch-as-catch-can, once-a-year, part-time operation to a professional show, with its own look and its own reputation. That change in turn created the opportunity for the show to have both trade days (sponsored by The Academy for the Advancement of High End Audio) and consumer days in 1996, with a result that we expect to be truly sensational for exhibitors

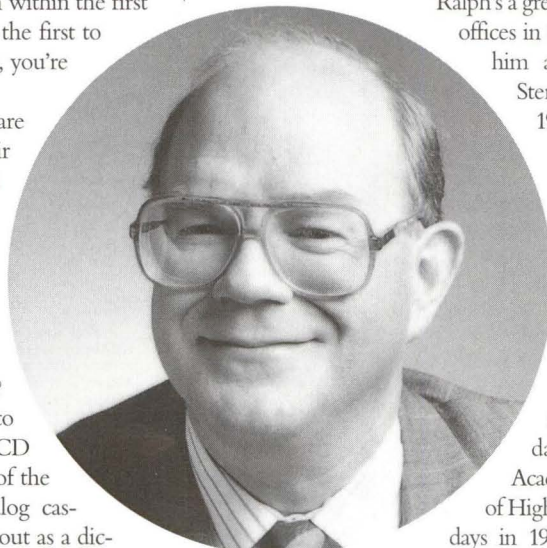
and attendees alike. (The show is still a week off as I write this.)

I’m looking for Ralph to have a similar effect on the whole company. His background is in organizational planning (his last job was running the Society for American Archaeology), and we can sure use some. The last person whose arrival I looked forward to this much was John Atkinson. (I didn’t have a chance to look forward to LEU—we hired him a week after we interviewed him!)

Speaking of JA, he’s just received a promotion to Vice President/Editorial Director in recognition of the key role he plays at Stereophile, Inc. as editorial strategist and deep thinker. John started planning where *Stereophile* needed to go six months before he even started working for us, and he’s been doing it at the same intense pace for 10 years now (his 10th anniversary was Memorial Day, 1996). Most of his energy goes into *Stereophile* (the magazine), but all of the company’s ventures benefit from his scrutiny and foresight. Speaking from the heart: Thanks, John!

SGHT

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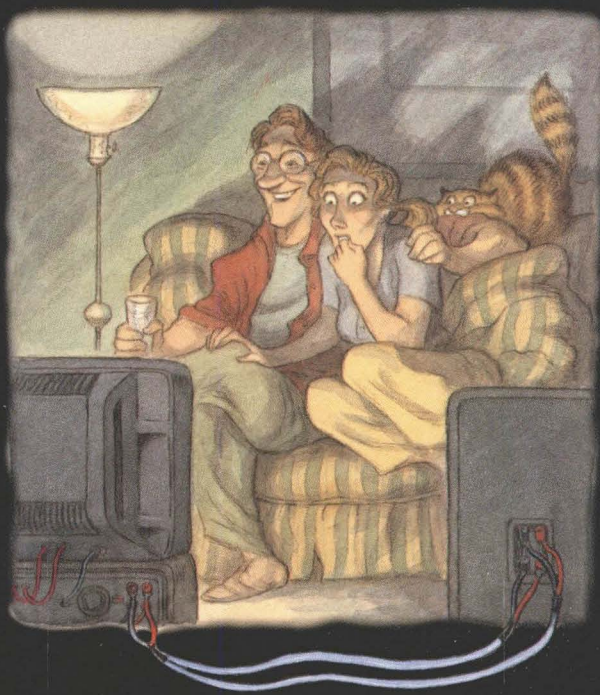
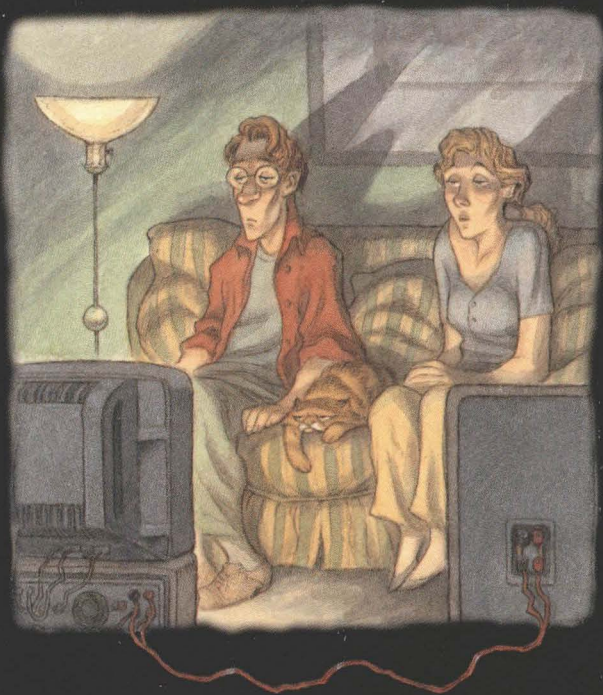
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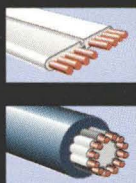


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